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STEEL

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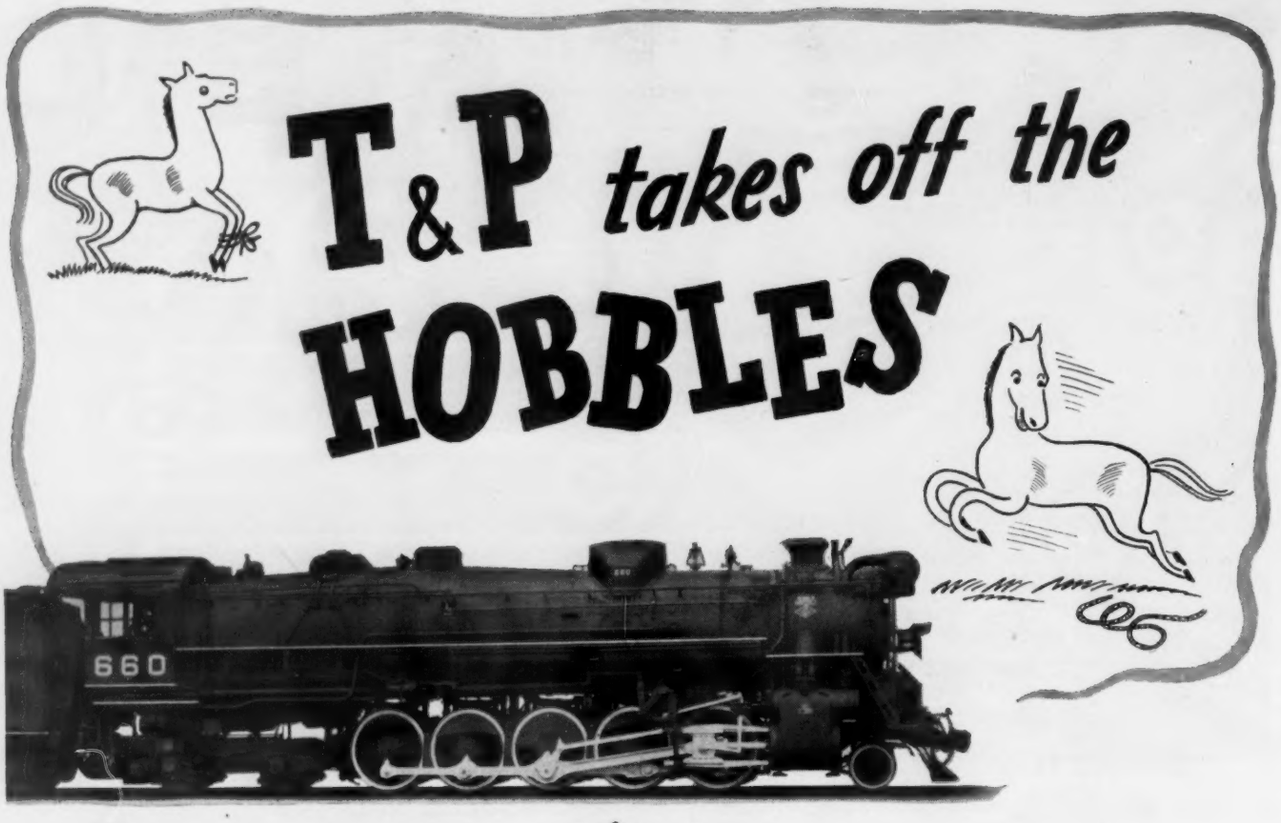
PRODUCTION · PROCESSING · DISTRIBUTION · USE



...Now '29 locomotives keep '39 schedules

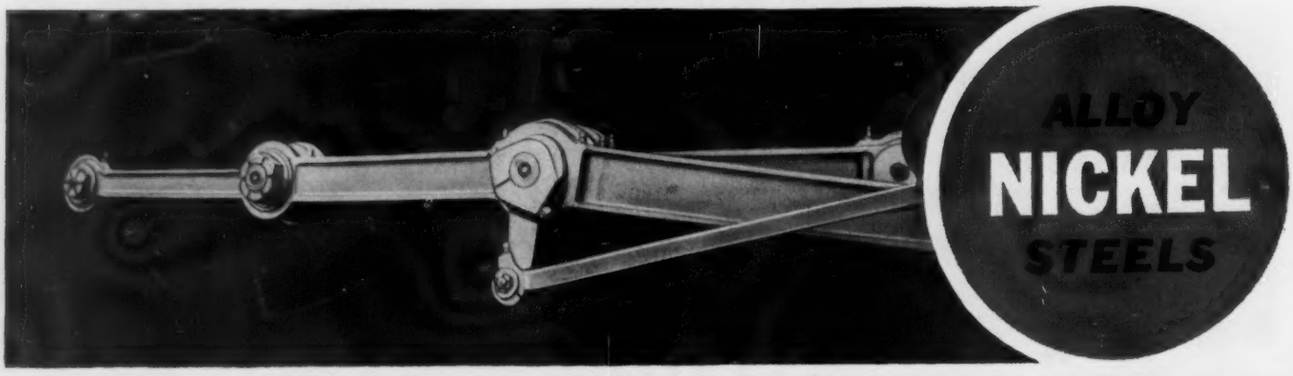
In 1929-30 the Texas & Pacific bought seventy 2-10-4's from the Lima Locomotive Co., designed and balanced for speeds of 38-45 m.p.h. But today's faster freight schedules demand modern motive power. Read how the T & P utilized Nickel alloy steels to provide for greater locomotive speed.

J. J. Prendergast, Mechanical Superintendent of the T & P, writes from Dallas, "Engine 601 (Texas type) now has been rebalanced with main and side rods of Nickel steel, which allows us to operate at 60 mile speeds. We are equipping all 70 locomotives of this type with these new Nickel steels rods."

Nickel offers practical help in keeping your '39 schedules and staying within your '39 budget. Nickel — alloyed into irons and steels — lightens deadweight, minimizes corrosion, reduces breakage and retards wear. Please write for INCO Recommended Railroad Specifications and more examples of money-saving modernization methods.

HOW T & P CURED THROAT TROUBLE WITH NICKEL STEELS

Here's a tip from T & P experience: considerable trouble developed from fatigue failure of carbon steel plates used for inside throat sheets in fireboxes. Now Nickel steel firebox plates are installed as throat sheets and "the Nickel steel is rendering entirely satisfactory service."



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ OUTLOOK for steel consumption continues encouraging. Production last week (p. 28) continued at the 60 per cent rate. Now that General Motor's labor troubles apparently are ended for the present automotive specifications are expected shortly to increase. Structural steel demand is falling off (p. 85) but miscellaneous requirements continue large. Pipeline and shipbuilding requirements are up. Steel prices reflect greater strength and scrap is bullish . . . In the General Motors settlement, incidentally, UAW-CIO appears to have won nothing from its 30-day strike (p. 26) which cost 160,000 workmen millions in wages . . . Steel producers fighting the department of labor's minimum wage order under the Walsh-Healey act won a notable victory (p. 27) in the United States court of appeals.

• • •

To Study Tax Laws

While the seventy-sixth congress, at its first session, has not at all times reflected a true understanding of the needs of business, its record (p. 25) has been one of greater friendliness toward business than has been noted at Washington in some years. Encouragement is seen in the fact that over the remainder of the year subcommittees of the house ways and means committee will study taxation with a view toward recommending a tax law at the next session which will provide real relief to business. Business confidence also is more bouyant as a result of legislative rebuffs to the latest administration spend-lend measures. . . . First industry to be reviewed when the temporary national economic committee renews its hearings in October is oil. Next (p. 34) will come steel.

• • •

Profit In Steel Low

Net earnings of 13 leading steel companies, as reported in the usual form, aggregated $21,109,152 during the first half. Had preferred dividends been deducted prior to net earnings (p. 29), the indicated profit would have turned into a net loss of $1,165,565. The industry has not yet regained its financial health. . . . Total first half net income of 119 steel consumers was 124 per cent higher (p. 29) than in the first half of 1938. . . . American public increasingly is opposed (p. 34 to forcing workers arbitrarily to join unions. . . . Steel is winning wider acceptance (p. 30) as material for poultry housing and other accessories used by this important industry. . . . Republic Steel Corp. (p. 31) will concentrate magnetic ore up to 68.5 per cent iron at Mineville, N. Y.

• • •

How To Aid Employment

Far too long has business left the fundamental problem of unemployment in the hands of government, declares Robert A. Weaver, this week's contributor to STEEL's Forum on Re-Employment. He presents (p. 58) a well-formulated plan for an approach on this problem. One suggestion calls for a nation-wide contest for ideas on how re-employment can be stimulated. . . . Combination brake drums with an outer shell of pressed steel and a gray iron braking surface now are being produced (p. 46) in large volume. An unusual series of metal fabricating, melting, centrifugal casting and handling operations is involved. . . . Recent test results (p. 50) indicate the practicability of bridge roadways of steel plate welded to supporting beams and covered with a thin asphaltic surface.

• • •

Costs Cut By Welding

New welded design for aircraft of the all-metal or stressed-skin type (p. 55) is said to offer cost savings of 20 to 30 per cent; frame elements are few and diagonal bracing is eliminated. . . . Pivoted motor drives are found by one company to offer various advantages. They increase efficiency of the entire drive (p. 73) with better operation of driven equipment, and frequently reduce energy consumption surprisingly. . . . Modern recording instruments are invaluable in modern rolling mills (p. 63), making available data greatly aiding in the design of equipment, and its economical operation. . . . Production at a small blast furnace has been made much more efficient (p. 60) through installation of suitable materials handling facilities, including gas-electric buggies and a belt conveyor.

E C Kreutzberg

You Inland Men Save My Time

"It's refreshing, in a job like mine, to find men who really study my problems—who contribute so much toward solving them. You Inland men work like members of our own staff—always on the alert for ways to improve our quality or reduce our costs. I find that the time I spend with Inland sales representatives, metallurgists and executives is time spent to the advantage of our business."

A good many steel buyers feel that way—and so will a good many more, when they discover the real meaning and value of Inland Service.

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SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

More Friendly Attitude Toward Business Shown by Congress in Closing Days

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ MANY bills were introduced during the first session of the seventy-sixth congress dealing specifically with the steel and allied industries. Few were enacted. However, these bills will be pending when congress reconvenes on Jan. 3 for the second session.

Considerable legislation of general importance to the steel and other industries was enacted, including some relief in taxes. The educational orders bill and the strategic materials bill became law. Appropriations were provided for both measures.

Introduced in both houses were many bills dealing with embargoes on steel and other commodities. In some cases hearings were held, but no action was taken on any of them. Of course, the administration denounced the commercial treaty with Japan (STEEL, July 31, p. 15) and if the President does not embargo exports to Japan, there is some chance this will be done by congress.

House last week decisively turned down the President's spending-lending program.

At press conference following the house vote, the President did not seem unduly upset; the senate had so emasculated the bill that he did not care much when it was definitely killed by the house.

Among bills of interest to the industry were:

Senate

S. 572, by Senator Thomas, Utah, dealing with strategic minerals. Became law.

S. 651, Senator Schwellenbach, Washington, dealing with scrap steel export licenses. No action.

S. 843, Senator Sheppard, Texas, $32,500,000 for educational orders. Became law.

S. 1083, Senator Sheppard, Texas, to turn in old machine tools. Became law.

S. J. R. 123, Senator Pittman, Nevada, to prohibit steel and scrap exports to Japan. No action.

House

H.R. 61, Representative Hoffman, Michigan, to amend tin act. No action.

H. R. 979, Representative Crawford, Michigan, to prohibit exports of pig iron and scrap. No action.

H. R. 2873, Representative May, Kentucky, $32,500,000 for educational orders. Became law. Same as Sheppard bill.

H. R. 3419, Representative Fish, New York, to prohibit scrap exports to China. No action.

H. R. 3587, Representative May, Kentucky, turn in obsolete machine tools. Became law.

H. R. 3756, Representative Burdick, North Dakota, to nationalize steel industry. No action.

H. R. 4232, Representative Voorhis, California, scrap export embargo bill. No action.

H. R. 5191, Representative Faddis, Pennsylvania, raw materials piles. Combined with other bills. Became law.

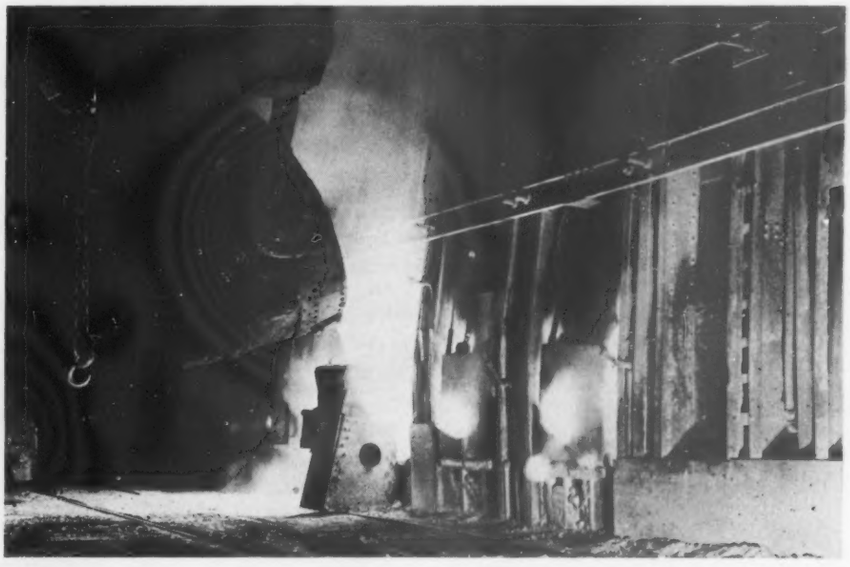
H. R. 5432, Representative Coffee, Washington, scrap embargo for Japan. No action.

H. R. 5840, Representative Faddis, Pennsylvania, tin act amendment. Passed house.

H. J. R. 42, Representative Crawford, Michigan, embargo on pig iron and scrap exports. No action was taken.

H. J. R. 363, Representative Al-

Inland's Open-Hearth Department Half-Mile Long



■ **More than a half mile long, Inland Steel Co.'s open hearth department at its No. 2 plant, Indiana Harbor, Ind., is reported the largest in the industry. Originally comprising 15 furnaces, nine have been added since 1936, bringing the total to 24. Nine newest furnaces are built to same general specifications, each of 150 tons capacity**

len, Pennsylvania, to prohibit steel exports. No action.

H. R. 275, Representative Bloom, New York, regarding new tin report. No action.

Controversial transportation bill passed both house and senate and was sent to conference, but no final action was taken owing to the great difference in house and senate measures.

Vigorous effort was made as the bill passed the house to strike out the provision which would bring inland and coastal waterways under the regulatory authority of the interstate commerce commission. The effort, however, was unsuccessful.

House did not take action on the senate amendment to the Walsh-Healey government contracts act lowering the present exemption of contracts up to $10,000 from the provisions of the act to $4000, and adding more black list provisions in relation to government contractors and suppliers for infractions of both the contracts act and the labor relations act.

Order Labor Board Probe

As this is written, every indication is that labor legislation, particularly modification by amendment of existing acts, will go by the board. Up to last Friday no action had been taken toward amendments to the national labor relations act, although committees of both houses of congress have conducted month-long hearings. The committees have long been accused of having "stalled" action on these amendments.

Subcommittee of house ways and means committee, of which Representative Cooper, Tennessee, is chairman, is to make an investigation during the recess of the whole tax program.

Among other things the Cooper committee will consider the complaint of business that tax revision during this session of congress failed entirely to meet its needs. It is believed on Capitol Hill that during the next session one of the most important tax revision bills in years will be up for consideration.

House resolution, by Representative Bloom, New York, calls for appointment of a subcommittee by the committee on foreign affairs to investigate the tin situation with regard to the dependency of the United States on foreign nations. The investigation would cover world control of tin prices and production by foreign countries; possible substitutes for and resources of tin which may be developed within the United States and its possessions; and "all other questions in relation thereto that would aid congress in any necessary legislation." Resolution was referred to rules committee.

House appropriated $50,000 to investigate the national labor relations board.

Investigating committee has not yet been appointed, but it is expected Representative Smith, Virginia, will be chairman as he introduced the resolution. Committee will consist of five men.

Senate approved several bills dealing with the patent situation, all of which were recommended by the temporary national economic committee.

Five have been passed by the house and now go to President Roosevelt. These would:

Reduce from two years to one year the period within which an inventor may make public use of his invention before filing application for a patent.

Revise "interference practices" and reduce the number of hearings which may be held.

Abolish so-called "renewal applications" for patents.

Extend the authority of the patent commissioner to enable him to require an applicant to respond to an official action within less than the current period of six months.

Reduce the period within which to copy claims from an issued patent for the purpose of asserting priority.

The measure which must be approved by the house before going to the President would limit the life of a patent to 20 years from the date of filing an application. Under present law patents run 17 years from date of issuance, but the monopoly committee found that this procedure made possible delays as long as 40 years, O'Mahoney said.

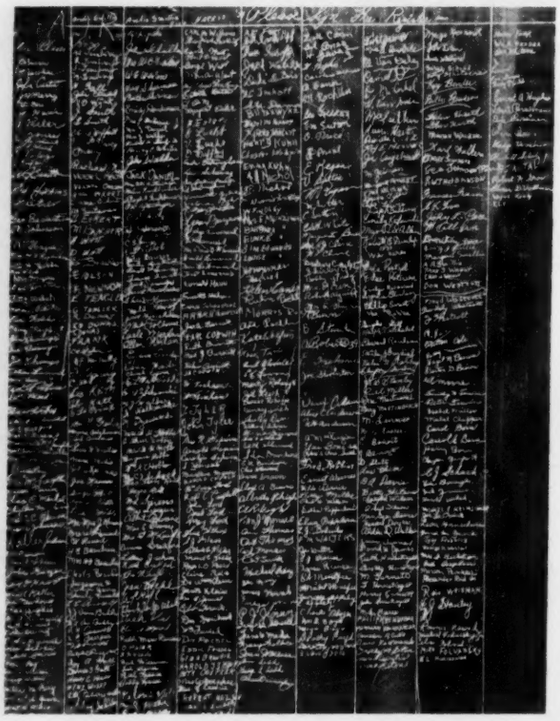
Nothing Won, Millions Lost; End of GM Strike

■ Month-old strike against General Motors Corp. was reported settled late last week pending ratification of agreement by the United Automobile Workers. Terms were not made public immediately, but were understood to involve:

1—Continuation of present UAW contract until the courts determine whether the AFL or CIO group is entitled to "ownership"; 2—guarantee by union no wildcat strikes will be called this fall and no strikes of any kind unless grievance machinery in contract fails; 3—corporation offer to spread tool and die work over longer period, keep more work in own shops; 4—corporation offer to amend loan plan to cover seasonal employes in tool and die work; 5—in effect, granting sole bargaining rights to CIO group where it is only committee in plant, but continuing recognition of AFL union where it has committees.

It appears the UAW has won nothing from the strike, while 160,000 workmen have lost millions of dollars in wages and GM has lost three weeks on new model programs.

Carboloy Visitors Sign Names on Plate Glass



■ **A sheet of plate glass was used as a guest-register "book" recently when Carboloy Co. Inc. held open house for employes and their friends at its new plant in Detroit. More than 1000 attended. The "pen" with which they wrote their signatures was a pointed rod of cemented carbide as manufactured by the company. The simple demonstration of the diamond-like hardness of the material greatly interested the visitors, incidentally serving to impress on their memory the name of a company, a product and its properties**

Appellate Court Upholds Steelmakers;

Orders Hearing on Minimum Wage Case

WASHINGTON

■ UNITED STATES court of appeals for the District of Columbia late last Friday overruled the federal district court in the case involving minimum steel wages for public contract work under the Walsh-Healey act, and remanded the case back to the lower court for further hearing.

The ruling was a victory for Lukens Steel Co., Coatesville, Pa., Alan Wood Steel Co., Conshohocken, Pa., and other companies which filed suit following the minimum wage determination made last January by Charles V. McLaughlin, assistant secretary of labor.

In its order the court of appeals said:

"Justices Miller and Vinson are of the opinion that the complaint states a valid cause of action entitling the plaintiffs to an injunction as prayed herein, and, therefore, are of the opinion that the district court was in error in dismissing the complaint.

"The grounds of this court's decision will be filed shortly and Justice Edgerton will file a dissenting opinion.

"A judgment will thereupon be entered remanding the cause to the district court with instructions to set aside and vacate its previous order dismissing the complaint, and directing that court to proceed in accordance with the opinion of this court."

Injunction Continued

When the case went to the court of appeals from the lower court the labor department was enjoined against making effective the proposed minimum steel wages, and in its order of Friday the court said that this injunction "will be continued in effect."

This means, of course, that while the case is in the lower court the public contracts board through the labor department will not be able to establish the proposed wages.

First determination of minimum steel wages to be paid for government contract work under the Walsh-Healey act was announced the middle of January by Mr. McLaughlin.

The labor department's ruling provided for four minimums, as follows: 62½ cents an hour in 17 northeastern and middlewestern states where the bulk of the iron and steel industry is located; 60 cents in 11 western states; 58½ cents for seven middlewestern states; 45 cents for 13 southern states.

Producers Protested

Mr. McLaughlin's determination brought immediate protest, especially from a group of the smaller eastern producers, whose wage rates were several cents below what Mr. McLaughlin found to be "the prevailing minimum."

Their attitude was expressed by Robert W. Wolcott, president of Lukens Steel who contended that the action: "Not only means an additional burden on a large number of small steel companies, but appears to have been taken without consideration of the factors which justify the present differential existing between such areas and which have been recognized in other areas. Study of the rates definitely indicates discrimination against the eastern area and the many small producers located therein."

Small eastern producers also contended the minimum rates decreed would tend to concentrate steel production with the larger and more favorably located producers, to the detriment of the smaller companies.

Originally the new minimums were to become effective Jan. 31. Producers asked for a delay of 60 days, were granted postponement to March 1.

Seven eastern producers carried their complaint to the United States district court for the District of Columbia; three were granted a temporary restraining order by Justice Jennings Bailey. Justice Bailey later sustained a government motion to dismiss the producers' case.

Producers then filed a petition in the District of Columbia court of appeals for temporary injunction pending hearing and decision of their appeal from the district court's decision dismissing their complaint. The appellate court granted a temporary injunction and argument on the appeal was heard April 3. Here counsel for the steel producers reviewed their earlier objections and particularly stressed that the labor department's construction of the word "locality" as used in the Walsh-Healey act was "plainly erroneous as a matter of law and that the determination predicated thereon was, therefore, beyond the statutory authority of the secretary of labor."

Court of appeals took the case under advisement and the wage minimums were suspended pending the court's decision.

Steel Employment and Payrolls Rise in June

■ Employment and payrolls in the steel industry increased in June, according to the American Iron and Steel institute, New York.

The average of 451,000 employes at work in the industry during the month compares with 448,000 in May, and 425,000 in June, 1938.

Total steel payrolls were $61,150,000 in June; $60,372,000 in May, and $46,706,000 in June last year.

Wage-earning employes received an average of 84.8 cents per hour compared with 83.5 cents in May and 84.5 cents in June a year ago.

ALABAMA IRON MINERS VOTE FOR CIO UNION

Employes at Woodward Iron Co.'s red ore mines in Alabama last week voted 454 to 81 for the International Union of Mine, Mill and Smelter Workers (CIO) as exclusive bargaining agency, as opposed to the American Federation of Labor. Four voted for no union and one vote was challenged, making a total of 540 out of the 568 eligible to vote. The election was under direction of the national labor relations board.

Pig Iron Output Advances 7.6%

■ COKE PIG IRON production in the United States in July continued to rise with 12 more stacks in operation at end of the month.

Average daily output was 76,001 gross tons, 5354 tons, or 7.6 per cent, more than the June average of 70,647. It was the highest since March's 77,201 tons. In July last year daily average was 39,131 tons.

Total in July was 2,356,036 tons, a gain of 236,614 tons, or 11.2 per cent, over June's 2,119,422 tons. This total was the largest monthly figure since March, with 2,393,255 tons, and compares with 1,213,076 tons in July, a year ago.

Output for first seven months this year was 14,877,167 tons, 5,732,993 tons, or 62.9 per cent, over 9,144,174 tons in the period in 1938. In the first seven months of 1937 the total was 23,272,694 tons.

Relating production to capacity, operations in July averaged 55 per cent, highest since March with 56.1 per cent. June rate was 51.4 per cent; July, 1938, 28.2 per cent.

Stacks in blast July 31 totaled 129, largest number since November, 1937, with 151, and 12 more than 117 at close of June. This compares with 106 in May and 102 in April. In July, one merchant and 13 steelworks furnaces were made active and two steelworks units were blown out or banked. Only 77 units were active at end of July a year ago.

AVERAGE DAILY PRODUCTION

Gross Tons

	1939	1938	1937	1936
Jan.	70,175	46,608	103,863	65,461
Feb.	73,578	46,655	107,857	63,411
March	77,201	47,496	111,951	66,004
April	68,511	46,267	113,354	80,316
May	55,404	40,675	114,360	85,795
June	70,647	35,958	103,843	86,551
July	76,001	39,131	112,947	83,735
Aug.	.....	48,242	116,676	87,475
Sept.	.....	56,103	113,932	90,942
Oct.	.....	66,694	93,259	96,509
Nov.	.....	76,222	66,901	98,331
Dec.	.....	71,378	48,499	100,813
Ave.	70,647	51,752	100,573	83,832

MONTHLY IRON PRODUCTION

Gross Tons

	1939	1938	1937
Jan.	2,175,423	1,444,862	3,219,741
Feb.	2,000,155	1,306,665	3,020,006
March	2,166,249	1,431,211	3,410,410
April	2,035,326	1,388,008	3,400,636
May	1,717,922	1,260,937	3,545,180
June	2,119,422	1,060,747	3,115,302
July	2,356,036	1,213,076	3,001,309
Tot. 7 mo.	14,877,167	9,144,174	23,272,694
Aug.	..	1,495,514	3,616,954
Sept.	.....	1,683,097	3,411,900
Oct.	.....	2,067,499	2,891,036
Nov.	.....	2,286,661	2,007,031
Dec.	.....	2,212,718	1,503,474
Total	.....	18,889,663	36,709,139

RATE OF FURNACE OPERATION

(Relation of Production to Capacity)

	1939[1]	1938[2]	1937[3]	1936[4]
Jan.	51.0	33.6	76.6	48.2
Feb.	53.5	33.6	79.5	46.4
March	56.1	34.2	82.5	48.5
April	49.8	33.4	83.7	59.1
May	40.2	29.4	84.3	63.1
June	51.4	25.5	76.6	63.6
July	55.0	28.2	82.9	61.5
Aug.	....	34.8	85.7	64.3
Sept.	....	40.5	83.7	66.9
Oct.	....	48.0	68.4	71.0
Nov.	....	55.0	49.3	72.3
Dec.	....	51.4	35.6	74.2

[1] Based on capacity of 50,198,920 gross tons, Dec. 31, 1938; [2] capacity of 50,606,400 gross tons, Dec. 31, 1937; [3] first half on capacity of 49,512,737 tons, Dec. 31, 1936 —second half on capacity of 49,727,737 tons, June 30, 1937; [4] capacity of 49,777,893 tons, Dec. 31, 1935. Capacities by American Iron and Steel Institute.

Furnaces blown in during July were: In Alabama: Ensley No. 6, Tennessee Coal, Iron & R. R. Co. In Colorado: Minnequa "E", Colorado Fuel & Iron Co. In Indiana: Madeline No. 4, Inland Steel Co. In New York: Lackawanna "G", Bethlehem Steel Co. In Ohio: Lorain Nos. 4 and 5, National Tube Co. One Massillon, River Nos. 1 and 3, Republic Steel Corp. One Mary, Sharon Steel Corp. In Pennsylvania: Duquesne No. 3, Carnegie-Illinois Steel Corp. Monongahela Nos. 2 and 3, National Tube Co. Shenango No. 1, Shenango Furnace Co.

Stacks blown out or banked were: In Ohio: Hamilton No. 1, Hamilton Coke & Iron Co. In Pennsylvania: Bethlehem "F", Bethlehem Steel Corp.

FURNACES AND OUTPUT

	No. in blast last day of July	No. in blast last day of June	Total tonnage Merchant	Total tonnage Non-merchant
Alabama	15	14	79,662*	131,470*
Illinois	7	7	19,166	159,267
New York	9	8	51,628	103,167
Ohio	33	28	62,123	495,260
Penna.	35	32	42,915*	565,599*
Colorado	2	1		
Indiana	10	9	2,775*	449,660
Maryland	6	6		
Virginia	1	1		
Kentucky	2	2		
Mass.	1	1		
Michigan	3	3		
Minnesota	1	1	14,711	178,633
Missouri	0	0		
Tenn.	0	0		
Utah	1	1		
West Va.	3	3		
Total	129	117	272,980	2,083,056

*Includes ferromanganese and spiegeleisen.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Aug. 5	Change	Same week 1938	Same week 1937
Pittsburgh	50	None	33	83
Chicago	56	None	38	86
Eastern Pa.	41	None	29	71
Youngstown	54	None	40	80
Wheeling	79	None	54	93
Cleveland	73	None	38	85
Buffalo	58	+ 7	39.5	86
Birmingham	70	—14	50	96
New England	68	+28	35	65
Cincinnati	31	None	58	89
St. Louis	47.5	None	30	77
Detroit	64	None	38	90
Average	60	None	40	84.5

PRODUCTION

■ STEELWORKS operations last week were unchanged at 60 per cent. Nine districts were steady, two made slight increases and one declined. A year ago the rate was 40 per cent; two years ago 84.5 per cent.

Cleveland—Held at 73 per cent. An increase is indicated for this week.

Youngstown, O. — Production showed no change, at 54 per cent, 46 open hearths and three bessemers being active. Carnegie-Illinois Steel Corp. has started a fourth blast furnace at Ohio works.

Birmingham, Ala. — Down 14 points to 70 per cent, two open hearths at Fairfield, Ala., being dropped.

Detroit — Steady at 64 per cent for the fourth week.

Chicago — Unchanged at 56 per cent. Two important producers increased production but a large independent curtailed, preparatory to installing new equipment.

Cincinnati — Held at 31 per cent with indications for a sharp increase this week.

St. Louis — Remained at 47.5 per cent for the third week, with no indication of material change.

Central eastern seaboard — With one producer at slightly lower rate and two others increasing production, the average was unchanged at 41 per cent.

New England — Up 28 points to 68 per cent. Further rise is scheduled for this week.

Pittsburgh — Continued at 50 per cent, with indications for the same rate this week. Lighting of two Jones & Laughlin blast furnaces brings pig iron production to the same level as steelmaking.

Wheeling — Held at 79 per cent for the fourth week.

Buffalo — Advanced 7 points to 58 per cent. In four weeks the rate has advanced 25.5 per cent.

FINANCIAL

STEEL PRODUCERS' EARNINGS STATEMENTS

■ IN TABULAR summary of 13 steel producers' financial statements (STEEL, July 31, p. 17) Jones & Laughlin Steel Corp. was shown erroneously as having earned $471,287 in second quarter, 1939. An asterisk, denoting loss, was omitted.

With this revision, aggregate net earnings for the 13 producers for second quarter was $11,256,835, instead of $12,199,409, as reported.

Net profit for the identical producers in the first quarter was $9,852,317, making total net profit in the first half $21,109,152. In the comparable period, 1938, their aggregate net loss was $12,426,876.

The foregoing is a composite of the statements issued by the producers. It represents their customary method of summarizing their profit or loss statements. These statements take into consideration interest on bonds, but not preferred dividend requirements. While these requirements may be considered "fixed charges," nevertheless they do not have the same standing as bond interest. As the *New York Times* points out:

"The real distinction lies in the fact that preferred stockholders cannot petition a company into receivership or take over its operations, although there are instances when preferred stock may elect all or part of the directors after arrears have reached a certain level. Owners of debt, on the other hand, may take over the property if their income or principal is endangered."

Preferred dividend requirements vary widely; three of the 13 steel companies in STEEL'S list do not have preferred stock.

However, if preferred dividend requirements are considered, the picture for steel is still less favorable. And, since some question has been raised as to the advisability of computing profit or loss with this factor included, an approximation has been arrived at as follows:

Preferred dividend requirements for the ten companies which have such stock were about $22,274,817 for the half year. This is based on their total preferred dividend requirements for the full year 1938, as given in annual reports.

Figured this way, the composite for the 13 instead of showing a meager profit, indicates a net loss of $1,165,565 for the first half. Similarly figured, their 1938 first half net loss was $34,701,693.

Consumers' Net Income Up 124 Per Cent

■ Total first half net income of 119 steel consumers and suppliers aggregated $73,506,225, an increase of 124 per cent over the $32,807,107 total income reported by them in the comparable 1938 period. STEEL'S tabulation July 31, p. 18, included 39 companies; the tabulation July 24, p. 20, included 35 while the following table lists 45. Only 23 of the 119 companies recorded a loss in the first half this year, while a year ago 56 companies had a deficit. All figures are net income, except where asterisk denotes loss.

	Second Quarter 1939	Second Quarter 1938	First Half 1939	First Half 1938
Air Reduction Co., New York	$1,205,340	$888,757	$2,232,595	$1,684,347
Addressograph-Multigraph Corp., Cleveland	243,201	304,150	503,032	613,963
A. M. Byers Co., Pittsburgh	173,372	81,916*	296,370	291,597
American Locomotive Co., New York	.....	.....	931,710*	841,657*
American Steel Foundries Co., Chicago	218,549	487,771*	114,343	866,195*
Autocar Co., Ardmore, Pa.	.....	.....	192,190	357,103*
Bath Iron Works Corp., Bath, Me.	.....	.....	206,146	139,921
Black & Decker Mfg. Co., Towson, Md.	179,063	63,887	316,488	147,378
Briggs & Stratton Corp., Milwaukee	208,189	231,481	552,377	396,944
Chapman Valve Mfg. Co., Indian Orchard, Mass.	86,102	183,856	109,648	415,825
Curtiss-Wright Corp., New York	1,672,647	1,447,951	3,370,804	2,181,862
Diamond T Motor Car Co., Chicago	52,632	8,024	98,928	11,833*
Dresser Mfg. Co., Bradford, Pa.	.....	.....	81,383	73,039*
Easy Washing Machine Corp., Syracuse	47,372	132,076*	143,242	258,417*
Electrolux Corp., New York	374,697	543,458	818,611	1,211,705
Emsco Derrick & Equipment Co., Los Angeles	48,241*	61,799	98,788*	194,176
Eureka Vacuum Cleaner Co., Detroit	43,570*	80,806*	70,656*	149,019*
Fairbanks Morse & Co., Chicago	.....	.....	718,397	51,780
Food Machinery Corp., San Jose, Calif.	318,961	251,953	572,017	466,350
Gar Wood Industries Inc., Detroit	109,480	123,759	102,552	46,473*
General Cable Corp., New York	26,494	260,083*	170,279*	326,230*
General Steel Castings Corp., Eddystone, Pa.	100,105*	412,061*	514,790*	618,670*
Gillette Safety Razor Co., Boston	749,360	674,561	1,616,908	1,430,425
Graham-Paige Motors Corp., Detroit	364,370*	441,144*	716,342*	891,126*
Holland Furnace Co., Holland, Mich.	291,588	316,777	132,944	120,365
Hupp Motor Car Corp., Detroit	284,978*	226,401*	479,207*	516,897*
International Business Machines Corp., New York	2,147,539	1,939,133	4,392,356	4,019,303
Kalamazoo Stove & Furnace Co.	5,437*	32,500*	129,922*	112,767*
Kelsey-Hayes Wheel Co., Detroit	54,923	122,735*	379,639	476,518*
Maytag Co., Newton, Iowa	172,759	2,495*	563,687	85,828
McCord Radiator & Mfg. Co., Detroit	.....	.....	81,631	166,808*
Midland Steel Products Co., Cleveland	476,411	162,815	1,017,377	334,697
Mullins Mfg. Co., Salem, O.	22,840	182,869*	117,680	317,955*
Otis Elevator Co., New York	620,530	337,104	1,578,157	1,135,217
Outboard Marine & Mfg. Co., Waukegan	727,791	465,380	919,333	601,642
Pierce Governor Co., Anderson, Ind.	.....	.....	49,013	28,686
Reed Roller Bit Co., Houston, Tex.	433,115	783,532	839,560	1,204,180
Simonds Saw & Steel Co., Fitchburg	155,235	59,794	371,346	82,768
Spicer Mfg. Corp., Toledo, O.	392,208	9,200*	831,180	151,669
Stewart-Warner Corp., Chicago	53,986	178,144*	200,261	393,210*
Studebaker Corp., South Bend, Ind.	717,400	868,009*	774,314	1,940,360*
Thatcher Mfg. Co., Elmira, N. Y.	215,312	183,314	339,231	301,200
White Motor Co., Cleveland	.....	.....	469,045*	884,778*
Wright Aeronautical Corp., Paterson	1,099,311	1,081,958	2,331,036	1,668,246
Yale & Towne Mfg. Co, Philadelphia	5,986	152,624*	12,591	147,528*

FIRST HALF PROFITS FOR 365 INDUSTRIALS

Combined net profits reported by 365 leading industrial corporations for the first six months this year are approximately double the total reported for the first half last year, according to the National City bank, New York.

The 365 concerns earned $397,323,000 in the first half, compared with $198,221,000 in the same period last year. Average annual rate of return on investment was 7.1 per cent on the basis of first half statements; rate figured on first half 1938 earnings was 3.5 per cent.

Bank's study lists the annual rate of return for United States Steel Corp. as 0.3 per cent, computed on first half profit. For 31 other iron and steel companies, the bank figures annual rate of return to be 2.4 per cent.

For 306 manufacturing companies, average annual rate of return was 7.4 per cent on basis of first six months earnings, compared with an average of 3.5 per cent on basis of first half 1938 profits.

Six aircraft and parts manufacturers averaged 24.6 per cent annual rate of return, the highest of any group covered. General Motors' first half profit was at an annual rate of 19.7 per cent.

Imports Show 37.6% Increase

■ FIRST half iron and steel imports, excluding scrap, totaled 162,191 gross tons valued at $10,041,158, a gain of 37.6 per cent over 117,815 tons valued at $7,421,877 in first six months of 1938, according to the metals and minerals division, department of commerce.

June imports were 24.3 per cent above May; 30,050 tons, valued at $1,487,504, compared with 24,171 tons, with a value of $1,405,883 in May, and 15,573 tons valued at $1,035,536 in June, 1938.

Belgium supplied the largest tonnage in June, 9074 tons, including 3542 tons of shapes, 1332 tons hoops and bands, 1203 tons bars; and 1032 tons cotton ties. Canada was second with 7430 tons, of which spiegeleisen represented 5790 tons and rails and track material 1329 tons. France sent 3482 tons, 1641 tons of shapes being the largest item. The Netherlands ranked fourth with 3322 tons, including 1802 tons of pig iron and 1495 tons of ferromanganese.

Scrap imports in June were 2537 tons valued at $23,745, compared with 3971 tons valued at $37,282 in May, and 314 tons valued at $2729 in June, 1938. Scrap imports for six months totaled 14,803 tons with value of $155,595, against 1170 tons valued at $18,451 in first half, 1938.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL
Gross Tons

	1939 Exports	1939 Imports	1938 Exports	1938 Imports
Jan.	362,672	27,664	586,294	29,631
Feb.	359,690	19,149	460,640	19,589
March	474,360	25,369	526,883	11,827
April	394,008	44,083	489,202	21,237
May	532,641	28,142	540,639	20,814
June	588,856	32,587	312,021	15,887
July	.....	.....	263,699	14,728
Aug.	.....	.....	242,139	20,041
Sept.	.....	.....	346,068	27,958
Oct.	.....	.....	425,431	26,445
Nov.	.....	.....	469,596	27,627
Dec.	.....	.....	490,095	28,767
Total	.....	.....	5,152,707	264,551

ORIGIN OF JUNE IMPORTS
Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Norway	22,735	.....	.....	870
Sweden	14,282	.....	.....	.....
United Kingdom	59	.....	.....	.....
Canada	75	211	.....	.....
Mexico	124	.....	.....	.....
Cuba	21,594	.....	1,400	.....
Chile	123,250	.....	.....	.....
Iran	15	.....	.....	.....
Philippine Isl.	22	.....	.....	.....
Algeria	7,000	.....	.....	.....
Netherlands	.....	1,802	.....	1,495
British India	.....	2,263	3,891	.....
France	.....	.....	14	129
Gold Coast	.....	.....	5,911	.....
Soviet Russia	.....	.....	4,208	.....
Total	189,156	4,276	15,424	2,494

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Belgium	43	3,542	1,203	1,332
United Kingdom	4	.....	16	.....
Canada	1	.....	2	.....
Sweden	9	.....	142	.....
France	.....	1,641	713	509
Germany	.....	.....	16	.....
Total	57	5,183	2,092	1,841

U. S. IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS
Gross Tons

Articles	June 1939	May 1939	Jan. thru June,'39
Pig iron	4,276	3,219	15,854
Sponge iron	262	6	871
Ferromanganese (1)	2,494	4,670	18,508
Spiegeleisen	5,792	1,214	13,969
Ferrochrome (2)	3	17	93
Ferrosilicon (3)	151	63	796
Other ferroalloys (4)	.....	25	132
Steel ingots, blooms	.....	1	4
Billets	79	40	205
Concrete reinforc. bars	399	275	1,980
Hollow bar, drill steel	96	168	636
Bars, solid or hollow	2,092	1,408	10,454
Iron slabs	.....	.....	.....
Iron bars	37	47	313
Wire rods	782	863	5,011
Boiler and other plate	14	2	19
Sheets, skelp, saw pl.	57	160	1,033
Die blocks or blanks	.....	65	80
Tin plate, taggers' tin and terne plate	12	5	36
Structural shapes	5,183	5,008	25,875
Sashes and frames	.....	.....	5
Sheet piling	.....	.....	462
Rails and fastenings	1,341	720	4,227
Cast-iron pipe and ftgs.	36	76	387
Mall. iron pipe ftgs.	78	4	102
Welded pipe	280	389	3,622
Other pipe	400	364	24,246
Cotton ties	1,032	31	1,065
Other hoops and bands	1,849	2,061	10,890
Barbed wire	1,883	1,829	10,258
R'nd iron & Steel wire	128	116	1,298
Tele and telephone wire	.....	.....	2
Flat wire & steel strips	261	313	1,570
Wire rope and strand	116	143	1,055
Other wire	125	132	1,116
Nails, tacks, staples	735	621	4,903
Bolts, nuts, rivets	3	17	63
Horse and mule shoes	7	34	203
Castings and forgings	47	65	848
Total	30,050	24,171	162,191
Iron and steel scrap	2,537	3,971	14,803
GRAND TOTAL	32,587	28,142	176,994

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

Scrap Consumption in First Half Up 73.8%

■ Domestic consumption of scrap iron and steel in June is estimated by the Institute of Scrap Iron and Steel Inc., New York, at 2,428,000 tons, compared with 2,263,000 in May, and 1,257,000 in June, 1938.

For the first half of 1939 domestic consumption approximated 14,430,000 tons, according to the institute, an increase of 73.8 per cent over the 8,302,000 tons in the first half of 1938. Approximately one-half of scrap consumed is purchased or open market scrap, and one-half is "home" scrap.

Meanwhile, June exports of 398,888 tons of scrap brought the total of exports for the first half of 1939 up to 1,788,952 tons, as compiled by the department of commerce. This was fractionally under the 1,798.147 tons exported in first half, 1938.

Poultry Raisers Using More Steel

■ STEEL poultry housing is winning wider acceptance, promises an increasing market for galvanized sheets and other steel products. This was the consensus of farm agents, poultry raisers and equipment manufacturers attending the seventh World's Poultry congress in Cleveland last week.

Congress itself, attracting more than half a million visitors and exhibitors from every state and many foreign countries, is expected to give impetus to the use of such housing as well as other steel poultry equipment.

Rated by the department of agriculture as one of the three first farm industries, this country's six million flocks of poultry annually return a billion dollars worth of products, require large expenditures for new equipment yearly.

Advantages Demonstrated

Galvanized feed hoppers, water fountains, brooders, wire mesh and fence long have constituted an important part in such purchases. Not until recently, however, has the average poultry raiser turned toward steel housing. Important improvements in ventilating and insulating have eliminated an earlier objection that these structures were likely to "sweat" and the modern steel brooder or laying house is moisture and draft-proof.

Other advantages demonstrated to the congress' visitors were the portability, cleanability, and security from vermin and rodents. Sanitation made possible by steel houses, steel feed hoppers and drinking fountains and wire floors was stressed as a guard against diseases.

Also aiding the cause of steel poultry housing has been extension of rural electrification lines and the growing popularity of the electric brooder. Several manufacturers exhibited steel brooder houses especially adapted for use with the new type brooder.

Although it appeared steel housing offered the greatest potential increase in use of steel in poultry equipment, many other products, entirely or largely of steel, were shown; These included incubators, brooders, egg carriers and poultry crates, trap nests, grading benches and egg graders, fowl dressing equipment, candlers, feed mixers, mesh, fencing and posts.

■ Grumman Aircraft Engineering Corp., Bethpage, N. Y., has been awarded a $1,786,860 contract for airplanes and spare parts by the navy department.

What's New at Pittsburgh . . .

By R. L. HARTFORD
Pittsburgh Editor, STEEL

■ NEW PROPOSALS to the reconstruction finance corporation and an extension of time by federal courts apparently have brought closer the possibility of reorganization for Follansbee Bros.

Operating under section 77-b since 1934, the company has been in the hands of trustees for five years, and has been awaiting approval of reorganization plans for two years.

In July, 1937, the plan was first outlined, containing a petition to the RFC for $4,000,000 to modernize plants, construct a continuous hot strip mill, enlarge cold rolling capacity. This was taken under advisement but faded with the subsequent business decline, when RFC doubted the wisdom of installing another hot strip mill.

Since then a series of postponements interspersed with new attempts to obtain RFC approval has taken place. Latest of these occurred last week, when Federal Judge R. M. Gibson approved extension to Oct. 2, warned trustees he might invoke the court's privilege of appointing new trustees at that time unless action was forthcoming.

Company officials and trustees believe this will not be necessary, as they see good possibility of a reorganized company taking form before the end of summer.

New petition to the RFC reduces amount asked to $2,800,000, eliminates proposal to build a hot strip mill. Trustees last week told STEEL the RFC privately is pleased with the plan, principally because it abandons earlier attempts to get back into mass sheet markets, "already overcrowded."

Will Continue Present Line

New proposal indicates company will continue as at present, in specialty flat-rolled products, including hot and cold-rolled tin plate, electrical sheets and roofing ternes, of which Follansbee is a leading producer.

This year's business has improved 30 per cent over 1938 figures and the operations are showing a profit for the year to date.

Abandonment of the hot mill idea has made it necessary to go elsewhere for coiled strip. Trustees reported to the court an arrangement has been made with Jones & Laughlin Steel Corp. to supply the reorganized company, if and when it starts operations, with coiled hot strip from the Pittsburgh works.

Follansbee officials said the cost of this arrangement was satisfactory, and would place them in as good competitive position as if they had the hot strip capacity.

Indications are the strip will be shipped down river from Pittsburgh to Follansbee via J & L's barge line subsidiary. New facilities are to be constructed at Follansbee to take advantage of river shipments.

What's Ahead?

An American firm recently queried 2000 research men both here and abroad as to the contributions which may be expected from industrial research over the next three years. Several replies were significant.

Of interest to car shops, and already well on the way, are cheaper chromium steels for railroad rolling stock. Sheet metal with coloring throughout will be produced for decorative applications, such as store fronts, automotive uses and house trim.

Further development of processes for refining domestic manganese ore will be seen, particularly for war time needs. Rubber will be more widely used in lining metal parts subject to corrosive action, as well as on bearings which then may be lubricated with water. Newly developed roller bearings will be used on freight cars to reduce bearing maintenance.

Revives Interest In Eastern Mines

NEW YORK

■ BROADENING scope of operation of the Republic Steel Corp. in northern New York is considered by local ore interests to be one of the most important developments in eastern mining in recent years.

Marking definitely a growing appreciation by blast furnace operators of the value of magnetic ore under improved concentrating and sintering methods now available, Republic's program is expected to assure a more steady, if not increasing, flow of upper New York state ores for years to come.

Republic became interested in the New York ore properties several years ago, acquiring a lease on Witherbee Sherman Corp.'s ore properties. Properties included ore mines, 100,000 acres of ore-bearing land near Lake Champlain, a concentrating plant at Mineville and a Greenawalt sintering plant at Port Henry.

Within the past fortnight company has announced plans for a new concentration plant (with concentration by the wet process instead of dry) at Port Henry, and acquisition of a 25-year lease from Chateaugay Ore & Iron Co. for operation of its mine in Lyon Mountain.

This property has a rated annual capacity of 1,200,000 tons crude ore and 600,000 tons concentrates. Connected with the property is a Dwight-Lloyd sintering plant with annual capacity of 360,000 tons. Ore is low in phosphorus and is being concentrated up to 68.5 per cent iron, an exceptionally high concentration, considering the theoretical limit on magnetic ore is 72.4 per cent.

Scheduled for completion in four or five months, the new concentrating plant to be erected for handling the Witherbee Sherman ores will have an annual capacity of 500,000 tons, a capacity which later may be expanded to 1,000,000 tons. New plant will crush ore finer than was possible at the old plant, will eliminate phosphorus to a greater extent and give a higher concentrate of iron. The wet process will eliminate dust hazards.

The Chateaugay blast furnace at Standish, with a rated annual capacity of 100,000 tons, will be closed indefinitely, primarily because of lack of outlet for waste gases. The Port Henry blast furnace of Witherbee Sherman has been out of operation since 1934. In 1937, one of two furnaces was partially dismantled; the other was relined in 1929, and there were other improvements around that time, bringing total cost to more than $5,000,000.

Republic will smelt the ore obtained at the upper New York state properties at Buffalo and Cleveland, and with the higher concentration proposed for the Witherbee Sherman ores, the company will stand to benefit on its transportation costs. Much of the ore will be shipped by rail from Port Henry to Buffalo.

Develop Beneficiation

In New Jersey and eastern Pennsylvania there has been considerable development in recent years in the concentrating and sintering of magnetic ores.

Of the three major magnetic iron regions, the Adirondacks in New York have the largest reserves, with New Jersey second and the Cornwall properties in Pennsylvania, owned by the Bethlehem Steel Co., third, it is said. Considering all the nontitaniferous iron ore properties in New York, estimates of reserves average 900,000,000 tons of magnetite, running 40 to 60 per cent in iron; in New Jersey, 600,000,000 tons, also running 40 to 60 per cent in iron.

Republic's program in upper New York has awakened interest in magnetic ore properties in the lower Hudson river valley.

MEN OF INDUSTRY

■ S. H. REYNOLDS, associated with Crucible Steel Co. of America, New York, since 1924, has been appointed manager of stainless steel sales. He was active in the New England territory, prior to becoming manager of Crucible's Atlanta, Ga., branch in 1932. M. J. McKeever has been made acting manager of the Atlanta branch. He has been with the company eight years, starting in the laboratory at Crucible's Halcomb mill, Syracuse, N. Y., and more recently was active as a sales representative at Atlanta. J. P. Larkin has been appointed manager of Crucible's magnet department, with headquarters in New York.

♦

Philip M. Guba, manager of sales, Chicago district, Carnegie-Illinois Steel Corp., has been appointed eastern sales manager, with headquarters at New York and Pittsburgh. He will co-ordinate sales activities of the company's offices in the eastern area, which include those at Boston, Hartford, Conn., New York, Philadelphia, Baltimore and Washington. Mr. Guba joined Carnegie-Illinois in March, 1933, as assistant manager of sales at Detroit; two years later was made manager of sales there, and in January, 1938, became manager of sales, Chicago district.

Succeeding Mr. Guba as manager of sales at Chicago is Griswold A. Price, heretofore manager of sales, bar, strip and semifinished materials division, general sales department, Pittsburgh. He has been with Carnegie-Illinois since graduation from Northwestern university, and has served in various capacities at the mills; in the general sales department and in the district sales offices.

Thomas J. Bray Jr., associated with Carnegie-Illinois the past three and a half years, recently as manager of sales, Pittsburgh district, succeeds Mr. Price as manager of sales, bar, strip and semifinished materials division, general sales department, Pittsburgh. Joseph G. Armstrong Jr., assistant manager of sales, Pittsburgh district, succeeds Mr. Bray. He joined the Duquesne works of Carnegie-Illinois in October, 1924.

S. H. Reynolds

♦

William Steytler, formerly district manager at Philadelphia for Pittsburgh Steel Co., Pittsburgh, has joined the Philadelphia sales organization of Jones & Laughlin Steel Corp.

♦

I. Ingalls, vice president, Ingalls Iron Works Co., Birmingham, Ala., sailed Aug. 4 on an 18-day Caribbean cruise.

♦

A. C. Geldner has been promoted to district sales manager at Los Angeles for Republic Steel Corp., Cleveland. Mr. Geldner joined Union Drawn Steel Co. in 1920 as a salesman in its Cleveland office, and continued in that capacity until 1928 when he was made Cleveland district sales manager. In 1932 he was transferred to Los Angeles and two years later became district sales manager, which post he held until early 1939 when he was appointed assistant district sales manager for Republic.

♦

F. A. Wright has been appointed manager of resale sales division, Cutler-Hammer Inc., Milwaukee, succeeding B. M. Horter, who recently was named general sales manager. Mr. Wright, associated with Cutler-Hammer since 1927, was formerly in the St. Louis sales territory.

♦

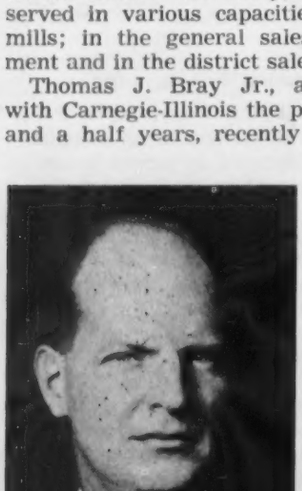
Henry W. Burritt has resigned as vice president in charge of sales, Kelvinator division, Nash-Kelvinator Corp., Detroit, to become president and general manager, Eureka Vacuum Cleaner Co., Detroit. With Mr. Burritt taking over the presidency of Eureka, Fred Wardell, president and founder of the company, becomes chairman of the board.

♦

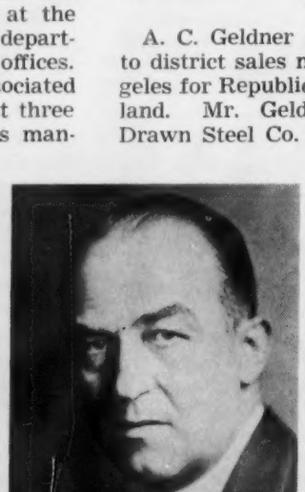
Frank Meredith, associated with the United States Steel Corp., New York, 26 years, has been made assistant superintendent of industrial relations, Carnegie-Illinois Steel Corp., in the Sharon-Farrell, Pa., district. Mr. Meredith, recently in the corporation's Pittsburgh office, formerly served the National Tube Co., McKeesport, Pa., and the Duquesne works of Carnegie-Illinois.

♦

Stanley P. Brown has been elected president and general manager, Hughes Tool Co., Houston, Tex. He succeeds Col. R. C. Kuldell, who has resigned to engage in the home construction business with his son, R. C. Kuldell Jr. Mr. Brown became associated with the Hughes company in 1919 and within two

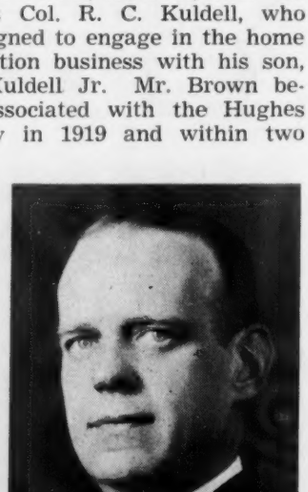


Griswold A. Price



Philip M. Guba

Thomas J. Bray Jr.



Joseph G. Armstrong Jr.

years was made sales manager. He held that position 13 years and in 1934 was made a vice president.

♦

Frederick M. Gillies, the past nine years assistant general superintendent, Indiana Harbor, Ind., plant of Inland Steel Co., Chicago, has been named general superintendent of that plant. He succeeds Henry R. deHoll, retired. Mr. Gillies joined Inland in 1922 as superintendent of the 100-inch plate mill, following which he was in charge of various divisions of the Indiana Harbor works.

♦

Edwin H. Peirce has been named superintendent, rod and wire department, Wheeling Steel Corp., Portsmouth, O. He formerly was

Edwin H. Peirce

associated with American Steel & Wire Co. for 20 years, as chief metallurgist and superintendent, New Haven, Conn., plant, and later as superintendent, South works, Worcester, Mass.

♦

Harold S. Schuler, formerly a division manager, apparatus advertising department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been appointed Pacific coast district sales promotion manager, succeeding Earl W. Nilsson, resigned. Before joining Westinghouse in 1937, he was associated with the Gulf Oil Corp., York Ice Machinery Corp., and had been an account executive with Ketchum, MacLeod & Grove Inc., Pittsburgh.

♦

William C. Van Cleaf has been appointed director of industrial relations, Allis-Chalmers Mfg. Co., Milwaukee, Wis. In this capacity he will act as chairman of the company's labor advisory board. Mr. Van Cleaf joined Allis-Chalmers in 1912 as an electrical apprentice, advancing to assistant foreman and electrical apprentice supervisor, gen-

Frederick M. Gillies

eral apprentice supervisor, employment manager, and in 1937 was placed in charge of all the company's personnel work.

♦

S. W. Sharbrough has been appointed agent for Electrunite steeltubes and Fretz-Moon conduit in Texas by Steel & Tubes Inc., a Republic Steel Corp. subsidiary, Cleveland. He will be located at 2427 South Ewing avenue, Dallas, Tex., and will also represent Thomas & Betts Co., Elizabeth, N. J., in connection with fittings and accessories for use with these two products. From 1927 to 1936 he was associated with Steel & Tubes as a salesman, working out of the Chicago, Dallas and Washington offices. He then spent two years with Wesco Products Co., Chicago, and two years with Arrow H & H Electric Co., Houston, Tex. In June this year he returned to Steel & Tubes on an agency basis.

DIED:

■ HERBERT M. BOYLSTON, 58, who, prior to his retirement a year ago was head of the metallurgical department of Case School of Applied Science, Cleveland, for 18 years, July 29 at his summer home in Edgartown, Mass. A graduate of Harvard in 1903, he remained there several years as an instructor, after taking a degree in metallurgy. From 1909 until 1920 he was associated with Prof. Albert Sauveur, and was co-inventor of the Sauveur patented magnetic specimen holder and the Sauveur-Boylston vertical magnifier. He also aided in the development of photomicrographic apparatus. Prof. Boylston was the author of *Introduction of the Study of Metallurgy,* and also wrote many papers on metallography of iron and steel. In 1916, 1923, and 1930, he was editor, iron and steel section of *Mark's Mechanical Engineering Handbook,* from 1913 to 1915 was secretary, iron and steel committee, American Institute of Mining and Metallurgical Engineers, and for a number of years was chairman, Cleveland sub-committee on metallurgy, A.I.M.E.

♦

Lee Stander, 61, president, Hauser-Stander Tank Co., Cincinnati, in that city, July 30.

♦

Fred W. Coombs, 69, vice president, Gisholt Machine Co., Madison, Wis., until his retirement in 1937, in Orlando, Fla., July 29. He was associated with Gisholt over 40 years.

♦

Franklin R. Johnson, 74, president, Aetna Portland Cement Co., Detroit, and chairman of the advertising committee, United Shoe Machinery Corp., Boston, July 19.

♦

John Draher, 82, president, Draher Machine Co.; treasurer, American Fastener Co., and vice president, General Mfg. Co., July 19 at his home in Waterbury, Conn.

♦

Henry J. Johnson, 70, retired general superintendent, Linde Air Products Co., New York, July 20 in Standish, Mich., where he was visiting relatives.

♦

Judson F. Webb, 58, chief engineer, Alabama By-Products Corp., Birmingham, Ala., in that city, July 25. He was a member, American Institute of Mining and Metallurgical Engineers.

♦

Aubrey Weymouth, 66, vice president and chief engineer, Post & McCord, structural engineers, New York, at his home in Flushing, Long Island, July 27. He was graduated from Lehigh university in 1894, and three years later joined Post & McCord.

♦

Ralph M. Rumbel, 60, manager, meter division, Westinghouse Electric & Mfg. Co., Newark, N. J., July 31 in Clarion, Pa. Mr. Rumbel had been associated with Westinghouse about 36 years, holding various positions in Chicago, Cleveland, Cincinnati and Pittsburgh before going to Newark.

♦

Thomas D. Witherspoon II, 64, designing engineer at Youngstown, O., for Carnegie-Illinois Steel Corp., July 30 in Youngstown. Before going to Youngstown in 1919 he was associated with the Toledo Furnace Co., Toledo, O., Union Electric Light & Power Co. and Milwaukee Electric Railway & Light Co. He was a member, American Society of Mechanical Engineers, and American Society of Electrical Engineers.

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ TEMPORARY national economic committee is in summer recess, but experts employed by various government departments under the committee's appropriation are gathering data to present to the committee in the fall. First to be heard when the committee resumes its work early in October will be the oil industry. However, it is expected a subcommittee, which has full authority to act, anticipates going further into the insurance question late in August.

When the department of justice will be ready to present the steel case to the committee is uncertain, but justice officials believe they will be able to follow the oil industry.

Some months ago the department of justice sent out two steel questionnaires, one dealing with prices and distribution for February of this year and the other with distribution for the three years 1936-1938. At first department experts were much chagrined at the slowness with which questionnaires were answered, particularly from the large steel companies. However, they now say questionnaires are coming in in good shape and that the steel industry is co-operating. It is believed the tabulations will be completed early in October.

Just how the justice department will present its steel story has not yet been decided. In addition to the elaborate tabulations which will be presented to the committee, it is possible the department will ask some steel executives to appear and explain certain figures.

Also a possibility is that the steel industry, either as a whole or individually, may be asked to hold their own hearings and tell their own story, if they so desire. This was indicated last winter when the federal trade commission presented its steel case and only its side of the case was heard inasmuch as the industry did not care at that time to offer any rebuttal testimony. Current story in Washington is that as various large steel companies prepared answers to the questionnaires, they also did some investigating of their own. Results may be presented at the hearing.

Senator O'Mahoney, TNEC chairman, had considerable trouble getting congress to make what he considered a sufficient appropriation for the committee. At the end of the last fiscal year, the committee had only $90,000 left of its $500.000 budget. It is estimated that on July 1, with the new appropriation, the committee had on hand $510,000. Among other things, of course, this money is used for hiring economists.

Federal trade commission, securities and exchange commission, department of labor, commerce department and other governmental organizations are continuing studies during the summer.

BRITISH MACHINE TOOL OUTPUT EXPANDS

Production of machine tools in Great Britain during 1938 reached an all-time peak, according to a report from Consul J. R. Wilkinson, Birmingham, made public by the department of commerce.

The total output during that year reached a value of approximately £12,000,000, an increase of £2,000,000 over 1937. The important aspect of this relatively great production increase, the report points out, is the plan of the industry ultimately to utilize its output capacity to eliminate imports as a serious factor and to gain a stronger foothold in overseas markets.

In face of the demands imposed upon the industry by the national armament program, it was able to expand its export trade from £2,151,000 in 1937 to £4,476,000 in 1938. The bulk of the machine tool exports consisted of general purpose units.

Because of armament program requirements, British machine tool imports in 1938 reached the relatively high total of £4,962,000, which compares with £6,212,000 in 1937. Of the 1938 imports, American machine tools accounted for £2,585,883, or more than 50 per cent. With the exception of a few heavy milling machines, imports from the United States were made up largely of special types of machinery which the British manufacturers either could not produce or which they could produce only at uneconomic costs or after too long a delay.

AGRICULTURAL IMPLEMENT IMPORTS DROP SHARPLY

United States imports of agricultural machinery during the first six months of 1939 amounted to only $2,017,012, a 33 per cent decline from the total of $3,003,602 for the same imports in the January-June 1938 period, according to the machinery division of the department of commerce.

Cream separator imports, the only group to show any gain, rose from $280,019 to $328,634. Greatest decline was registered by combines, headers, harvesters and reapers, which dropped from $889,854 in 1938 to $369,593 in 1939.

Only two countries increasing their exports to the United States were Sweden and Finland, the chief suppliers of cream separators to this market. Imports from Finland showed the most outstanding gain, rising 93 per cent from $65,818 to $127,297. Germany's exports of farm equipment to this country declined the most, dropping 81 per cent from $183,636 in 1938 to only $34,508 in 1939. The principal suppliers during the first half of 1939, in the order named, were Canada, Sweden, United Kingdom, Finland and Belgium.

PUBLIC OPINION AGAINST COMPULSORY UNIONIZATION

Increase in public sentiment against the arbitrary forcing of workers to join unions is indicated by a nation-wide survey by the National Association of Manufacturers.

Details of the survey were the

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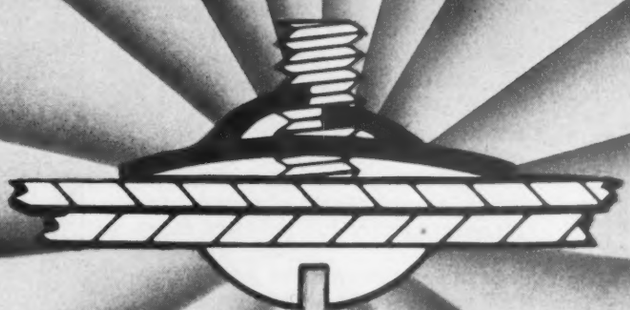
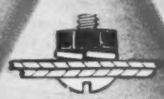


OLD  WAY

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Manufacturers of Patented SPEED NUTS

second part of a series of questions in a poll made for the NAM. First part of the survey (STEEL, July 31, p. 25), related to taxes, government spending and recovery problems.

Association in commenting on the poll stressed it did not "represent public opposition to unions or the right of workers to organize, but does show public emphasis on voluntary membership rather than the tactics used to make membership compulsory."

Question propounded on compulsory unionization was: "Should every worker be forced to join a union?" Results compared with the responses to the same question two years ago:

	1937	1939
	Per Cent	
No	57	61
Yes	23	20
Sometimes	9	11
Don't know	11	8

"Interesting is the fact that a breakdown of the replies reveals there has been a decided swing in the factory workers' opinion," the association commented. "It has been in the factory that the greatest high pressure efforts at unionization have been made."

Here is the way the factory workers answered the question of whether every worker should be forced to join the union:

	1937	1939
	Per Cent	
No	40.7	50.7
Yes	42.9	28.4
Sometimes	9.3	14.2
Don't know	7.1	6.7

The following are the results of the answer to the question "Who has done most for the United States in the last ten years?": Manufacturers, 24 per cent; industrialists, 14; merchants, 11; bankers, 10; labor leaders, 9; political men, 7; social reformers, 6; don't know, 32 per cent.

Total aggregates more than 100 per cent because some persons cited more than one group.

Association comments: "It is significant the custodians of the private enterprise system, the manufacturers, industrialists, the merchants and the bankers gathered 59 per cent of the entire vote, six times as many votes as the labor leader, over eight times as many as political men and ten times as many as social reformers. Compared to a similar question in 1937, manufacturers have stayed in first place and have increased their lead slightly, political men have dropped from second to sixth, and bankers have come from last to fourth place."

The following represents the changes in public opinion on this question today as compared with 1937: The favorable public attitude toward bankers increased 5.3 per cent as compared with 1937; the attitude toward merchants and manufacturers increased 2 per cent for each; for industrialists 0.7 per cent while social reformers, labor leaders and politicians lost a total of 13.2 per cent in the public's favor.

SURVEY CITES IMPORTANCE OF LATIN AMERICA'S RESOURCES

Survey of raw material resources of Latin America by the foreign policy association points out that "in time of war, Latin American resources of such strategic materials as tin, manganese, chromium, bauxite, antimony and tungsten might be of decisive importance, because of comparative ease of transportation and the invulnerability of Latin America to blockade."

The survey, written by Howard J. Trueblood, declared "Latin America, despite rapid strides in the development of its domestic manufacturing industries over the past few years, still owes its economic importance to its capacity as a primary producer."

In considering salient features of the area's economic structure, Trueblood says: "The Latin American economy is not perfectly complementary to that of the United States. As a matter of fact, this country provides only a limited market for many of Latin America's most important products, such as wheat, corn, meat, petroleum and most of the nonferrous metals." On the other hand, "Latin America furnishes so many commodities essential to this country's living standards that imports from Latin America are far more essential to the United States than exports to that region."

ICC ORDERS PROBE OF FREIGHT RATES, CLASSES

Interstate commerce commission last week ordered general investigations of "class rates, rail and water, applicable in the United States generally, except in mountain-Pacific territory and on transcontinental traffic; and freight classifications by rail and water, with a view to prescribing such rates and classification as may be found justified."

In the meantime, efforts now being made by carriers' and shippers' organizations to revise class rate structures, in the light of present conditions, and to simplify classifications should proceed, commission experts stated.

BRITISH TIN PLATE EXPORT OUTLOOK PESSIMISTIC

Although domestic demand arising from armament requirements has served to keep activity in the British tin plate industry at a relatively high level, the export outlook appears extremely pessimistic, according to a report from the American consulate in Cardiff to the department of commerce.

The confused state of the British tin plate export trade, the report revealed, is indicated in the recent announcement of the proposed establishment of a tin plate works in Australia. The new plant will have a producing capacity of approximately 100,000 tons per year which is in excess of the total Australian demand for sheets and tin plate.

Significance of the loss of the Australian market to the Welsh tin plate industry is revealed in the fact that in 1938 the commonwealth was the outlet for 85,000 tons of British tin plate, or about 37 per cent of total British exports of that item.

During the first half of the current year, shipments abroad of tin plate from Wales amounted to 171,000 tons which was approximately the same total recorded for the corresponding period of 1938.

EXTEND TIME TO DECLARE CAPITAL STOCK VALUE

Treasury department has extended the time in which domestic corporations may file a declaration of capital stock value under the 1939 revenue act to Aug. 31. The act permits new declarations for 1939 and 1940 if the value is adjusted upward; it may not be decreased.

MALLEABLE IRON CASTINGS PRODUCTION HIGHER

Malleable iron castings output during the first six months this year totaled 203,034 short tons compared with 113,902 during the first half of 1938, reports the census bureau.

Shipments during the first six months totaled 209,797 short tons compared with 129,746 in the corresponding 1938 period.

Orders booked, less cancellations, during the first half totaled 193,262 short tons, against 112,620 tons during the first six months of 1938.

GOVERNMENT IRON, STEEL AWARDS TOTAL $2,044,430

During the week ended July 22, the government purchased $2,044,429.53 worth of iron and steel products under the Walsh-Healey act as follows: Keystone Steel & Wire Co., Peoria, Ill., $10.779 (estimated); Bethlehem Steel Co., Bethlehem, Pa., $197,454.50; The Midvale Co., Washington, $21,547; Northill Co. Inc., Los Angeles, $13,713.60; Storms Drop Forging Co., Springfield, Mass., $10,412.70; Strong Steel Foundry Co., Buffalo, $34,369.33; National Can Corp., New York, $11,615 (estimated); Michigan Seamless Tube Co., South Lyon, Mich., $11,944.29; Lynchburg Foundry Co., Lynchburg, Va., $33,993.01; United States Pipe & Foundry Co., Philadelphia, $125,419.91; Republic Steel Corp., Massillon, O., $10,974.76; Bethlehem Steel Co., San Francisco, $18,462.26.

Bethlehem at World's Fair

NEW YORK

■ AN EDUCATIONAL display entitled "How Steel Is Made" is the central feature in Bethlehem Steel Co.'s exhibit at the World's fair. Attention immediately is attracted by a full size, 55-ton, all-welded ladle, suspended from the ceiling, with the reddish glow from its contents of molten steel playing overhead, and a stream of white-hot metal, simulated by illuminated lucite, flowing into a full size ingot mold.

Below this display, in a circular arrangement, are six animated panels showing the principal operations in steelmaking, blast furnace, open-hearth furnace, pouring platform, soaking pit, blooming mill and typical finishing mills. Sound recordings describe each step, while construction and operations of furnaces and equipment are portrayed by colored lights and moving parts. Wherever possible the furnaces are shown in cross section.

Three additional panels give the quantities of materials required in the production of one ton each of coke, pig iron and steel. By-products obtained in these operations are also shown.

Surrounding the central display are a number of supplementary exhibits. A feature is a small stage unit where two robots discuss steelmaking and applications of steel.

General uses of steel are brought out in a 40-foot mural representing a typical community, with business, manufacturing and residential sections and adjacent countryside. Bright lights show the community as it appears on a clear day. Then the light is dimmed and ultraviolet rays thrown on the mural. This, in combination with a paint invisible in normal light, reveals a veritable steel skeleton around which the community is built. The steel in the large buildings, bridges, railroads, highways, automobiles, home appliances, farm machinery, fence and numerous other uses is disclosed.

One section is devoted to Bethlehem products, ranging from small parts to 36-inch beams, including large coils of hot and cold-rolled sheets, wheels, axles, rails and track equipment, wire products, fence, wire rope, structural shapes, galvanized products and others.

A special shipbuilding exhibit centers around a model of the new liner PANAMA, built at Bethlehem's Fore River yard. Maps and illuminated transparencies of shipyards and vessels reveal the extent of Bethlehem's shipbuilding activities.

Would Rename Fair Building

To the Editor:

The American Chain & Cable Co. has been carrying a line in magazine and trade paper advertising this summer urging people to "see our exhibit in the Metals building at the World's Fair."

Because this building principally shows not raw metals, but materials fabricated from metals, our company has changed the line to read: "See our exhibit at the Metals (Products) building at the fair."

It is our belief that the name of the building should be so changed as more adequately to indicate the nature of its exhibits. Many people who no doubt are not interested as such would like to visit exhibits like our own and those of manufacturers of other products such as bearings, materials handling equipment and the like.

That many people have the impression that the building is devoted solely to metals is indicated by the description made by a guide on a sight-seeing tour we took a few days ago. He said, "On the right is the metals building, where they exhibit metals!" Who would guess from this statement that the building actually showed many interesting things in addition to steel, copper and brass?

J. O. LASHAR

Advertising manager,
American Chain & Cable Co.,
230 Park avenue,
New York

■ **Molten steel pouring from a full-size ladle into an ingot mold is simulated by lights in Bethlehem's exhibit. Iron and steelmaking processes are illustrated below the ladle. Many steel products are displayed**

Supply and Machinery Committees Appointed

■ Committees for the American Supply and Machinery Manufacturers' Association Inc., Pittsburgh, have been appointed as follows, by D. W. Northup, Henry G. Thompson & Sons Co., New Haven, Conn., who was elected association's president at its recent convention:

Membership: Chairman, Clifford B. Cecil, W. O. Barnes Company, Detroit; W. B. Ilko, Abrasive Co., Philadelphia; R. L. Hamilton, Dumore Co., Racine, Wis.; C. C. Chamberlain, Jenkins Bros., New York; James G. Geddes, H. K. Porter Inc., Everett, Mass.

Industrial Exhibits: Chairman, George Abbott, Alexander Bros. Inc., Philadelphia; J. F. Apsey, Jr., Black & Decker Mfg. Co., Towson, Md.; H. L. Coats, Flexible Steel Lacing Co., Chicago; Irving Lemaux, Jr., Indianapolis Brush & Broom Mfg. Co., Indianapolis; Harry Blum, Armstrong Blum Mfg. Co., Chicago.

Sales Promotion Literature: Chairman, C. F. Conner, B. F. Goodrich Co., Akron, O.; Roy D. Baldwin, Simonds Saw & Steel Co., Fitchburg, Mass.; M. W. Dallas, E. C. Atkins & Co., Indianapolis; A. M. Jones, Buffalo Bolt Co., N. Tonawanda, N. Y.; William Green, L. S. Starrett Co., New York.

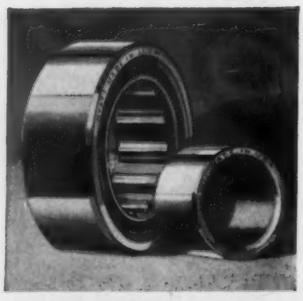
Research and Sales Survey: Chairman, George U. Hatch, Millers Falls Co., Greenfield, Mass.; E. S. Grant, Dodge Mfg. Corp., Mishawaka, Ind.; C. C. Ziegler, Greenfield Tap & Die Corp., Greenfield, Mass.; DeWitt VanderVoort, Victor Saw Works, Middletown, N. Y.; P. F. Callaghan, General Refractories Co., Philadelphia.

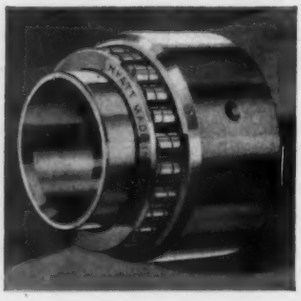
Constitution and By-Laws: Chairman, H. K. Clark, Norton Co., Worcester, Mass.; J. A. Gardner, Cincinnati Tool Co., Cincinnati; H. D. North, Ferry Cap & Set Screw Co., Cleveland; Roger Tewksbury, Oster Mfg. Co., Cleveland; C. L. Butts, Wood Shovel & Tool Co., Piqua, O.

Distributor Relations: Chairman, H. F. Seymour, Columbian Vise & Mfg. Co., Cleveland; vice chairman, W. A. Purtell, Holo Krome Screw Corp., Hartford, Conn.; L. M. Knouse, Stanley Electric Tool Co., New Britain, Conn.; Don S. Brisbin, Columbus-McKinnon Chain Corp., Tonawanda, N. Y.; C. H. Ingwer, Ridge Tool Co., Elyria, O.

Where the Going is Heavy

GO HEAVY ON HYATTS

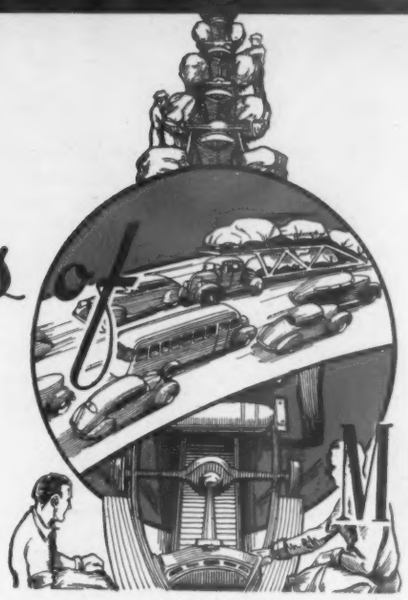




Those white hot ingots riding the blooming mill roller tables . . . so tough on the bearings carrying the rollers . . . are only one example of "heavy going" in steel mills. But here, as in the many other comparable bearing positions, only the fit survive. That's why Hyatts are so predominant in heavy mill service. Let us know when and where Hyatts can make light of heavy going for any of your equipment. Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT *Roller Bearings*

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ STEEL manufacturers who shared in the 2,000,000 tons of sheet and strip business placed by the automobile industry in 1938 had better begin giving some consideration toward dismantling their million-dollar rolling mills, because there is just not going to be any more need for steel in autos—if the opinions of certain prophets mean anything. The automobile is going plastic—in a big way.

Lest anyone become disconcerted by this rather broad statement, reassurance must be made that it is perhaps a trifle premature, and more a reaction from the August heat than from actual facts.

Nevertheless, a car with top made entirely of transparent plastic, has been developed by Briggs Mfg. Co. here for Chrysler Corp. and is now on display at the New York fair. Publicists for Briggs have released some information on the product which suggests it is little short of revolutionary. The material is called Steelplast and was developed under direction of John Tjaarda, head of the Briggs design research department.

Steelplast, says the Briggs company, is claimed to be stronger than steel—52,000 pounds tensile strength against 44,000 pounds—considerably more crashproof, tough without being brittle. Bodies made of it will weigh only one-half as much as steel bodies, and "will cost no more." Monosteel construction, which eliminates the conventional frame and makes the body a self-supporting unit, will be used in the plastic bodies.

This revolutionary new plastic is not a laminated material, but contains wood fiber. When still in slush form, the plastic is polarized, through which treatment the fibers are oriented lengthwise. How the material can be transparent with wood fibers in it is not stated, nor is it disclosed how the fibers can remain lengthwise through necessary fabricating operations.

Mr. Tjaarda states eventually the material can be used for bearings, cylinder blocks, transmission cases, rear axle housings, wheels, fans and other automotive parts. He says it has "only twice the expansion of steel, but will not corrode or deteriorate; does not warp, is a sound and heat insulator." Bodies of this material can be painted with synthetic enamel without using a primer coat. This covers just about everything.

It is often true that a material which looks like a world-beater to a designer meets some serious stumbling blocks in cost and production departments. A good deal more must be known about Steelplast before steel producers need feel much concern about its competitive possibilities in the automotive industries.

Much is being written these days about plastics, and how they are going to supplant metals in this and

Precision Unit Tests Crankshaft Balance

■ **DYNETRIC balancer, precision instrument employed by builders of high-speed airplane motors, now is used to balance crankshafts for Plymouth engines. Explaining its operation is O. W. Franke (right), master mechanic of Plymouth's Detroit plant. Unit transforms vibrations in the rotating shaft into an electric current which is amplified 1,000,000 times and recorded on the dial. Manipulation of the four knobs indicates how much metal must be removed to balance the shaft in four different planes**

that application. One example which comes to mind is an article on a substance known as Duramold, reported to have "ten times the compressive strength of stainless steel," and now being used to form halves of airplane fuselages by a company here in Michigan. Another is a so-called "lignin plastic" made by a Wisconsin paper mill company, said to sell for 5 cents a pound, with equivalent strength of steel, pound for pound.

Suppliers of plastic materials and powders are the first to discount the prodigious claims made for some of these materials. Experimentally they may appear to be little short of miraculous but when put to the hard test of commercial practicability, the story is yet to be told.

True, remarkable progress is being made in use and fabrication of plastics, but considered opinion is that their greatest future lies in conjunction with steel and other structural metals rather than in competition with the metals. In the field of injection molding, particularly, progress has been accelerated. A recent achievement is the injection molding of plastic steering wheels around a steel core, saving time and cost over previous compression molding methods. Of a similar nature is the injection molding of plastic over steel glovebox doors, instrument panels and the like.

One of the major cost factors in molding plastics is the outlay required for dies. Of a special grade of steel, such dies must be polished to a mirror finish and cannot be built up of inserts because joints between sections would leave fine lines or flashes on the molding which cannot be removed economically. When it is proposed to mold such large pieces as fenders, doors, tops and other automotive elements, the die costs involved seemingly will be terrific. Many such dies, in addition to requiring the utmost care in finishing, also must be provided with passages for steam heating which is essential in certain types of molding. Furthermore, press equipment for large plastic moldings must be enormous, and built at a cost almost commensurate with size.

■ NEW type of tappet developed for the 1940 Chevrolet engine is claimed to show a number of advantages, chief of which is greater quietness by reason of avoidance of pushrod slap. Present tappet is a hollow casting with chilled face which rides on the camshaft. The pushrod extends down through the tappet and seats on the inside of the lower face. In the new design, the cast iron body with chilled face is retained, but at the top is a so-called "flower pot" or cupped piece made of steel on screw machines. This is copper brazed to the cast body and the surface of the cup then hardened by induction heating and quenching. The pushrod rides in this hardened cup and thus can be made about 2 inches shorter.

Hydrogen furnace for the brazing operation is now going in at Chevrolet's Bay City, Mich., plant and the induction hardening equipment will be installed shortly. The latter in general comprises two bronze wheels adjacent to each other, with suitable inductor blocks mounted between them. Each wheel accommodates 36 tappets in holes around its outer edge. Through a speed reducer and Geneva motion the wheels are arranged to index one position every 1.2 seconds, carrying the tappets through the inductor blocks and quench to a chute where they drop out after being hardened to Rockwell 58. The steel cup is S.A.E. 1040, and a battery of 54 screw machines is now in operation turning out preliminary production requirements. It is understood eventually a duplicate setup for tappet production will be made at the Chevrolet plant in Tonawanda, N. Y. Production on the Bay City installation runs around 6000 per hour.

Another interesting type of induction hardening installation is that for treating rocker arm pads on Buick engines. These pads are of pearlitic malleable iron and formerly were hardened in a lead pot. In the new method they are placed in two rows in specially machined and baked fire lava fixtures attached to micarta cross bars riding on two stainless steel chains. The latter are endless and travel over sprockets mounted on the machine. As the rocker arms travel horizontally along the top of the machine, the pads or tips pass through slotted inductor blocks where they are heated to proper temperature, then cool an instant before being quenched. Hardness of Rockwell 58 is obtained on the surface of the pads, at a production rate of 1800 per hour.

Mention was made here recently of equipment perfected for induction hardening of Chevrolet rocker arm shafts. This is done at a rate of 600 per hour. The shaft is of S.A.E. 1015 cold-rolled tubing, carburized in gas furnaces before local hardening spots ½-inch each side of the six rocker arm fastening holes. Length of the shaft is 12½ inches, outside diameter 13/16-inch, with ½-inch hole. Rockwell C. hardness of 66-68 is obtained on the treated portions of the surface, at the same time maintaining straightness within limits of 0.005-inch on the length. Shafts are fed by pushers from a hopper into the inductor blocks, six spots on each shaft being hardened simultaneously. Three generators are required with the equipment, each supplying current to two inductors.

■ LARGEST collective bargaining election ever sponsored by the national labor relations board will be held in 14 Chrysler Corp. plants, eight Briggs Mfg. Co. units and Motor Products Corp. plant within the next two weeks to determine preference of employes for the UAW-AFL, the UAW-CIO or neither as bargaining representative. In all, about 75,000 employes are eligible to vote in the 23 plants concerned, and the event will be the first step taken in the automotive industry to determine by actual preference the wishes of employes in the matter of union representation.

Scattered instances of violence to workers trying to go through picket lines, clashes between pickets and police and other disturbances continue in the wake of the strike of tool and die makers in General Motors plants, now better than a month old. At midweek it appeared negotiations might be successful in terminating the dispute, but every day of delay saw friction mounting higher at various plants here and in Cleveland, Pontiac and other cities. All plans for 1940 model assemblies by the corporation are practically at a standstill.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
April	553,231	238,133	354,263
May	540,377	210,183	313,214
June	521,153	189,399	324,235
July	456,909	150,444	*198,000
7 mos.	3,373,778	1,456,501	2,245,288
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

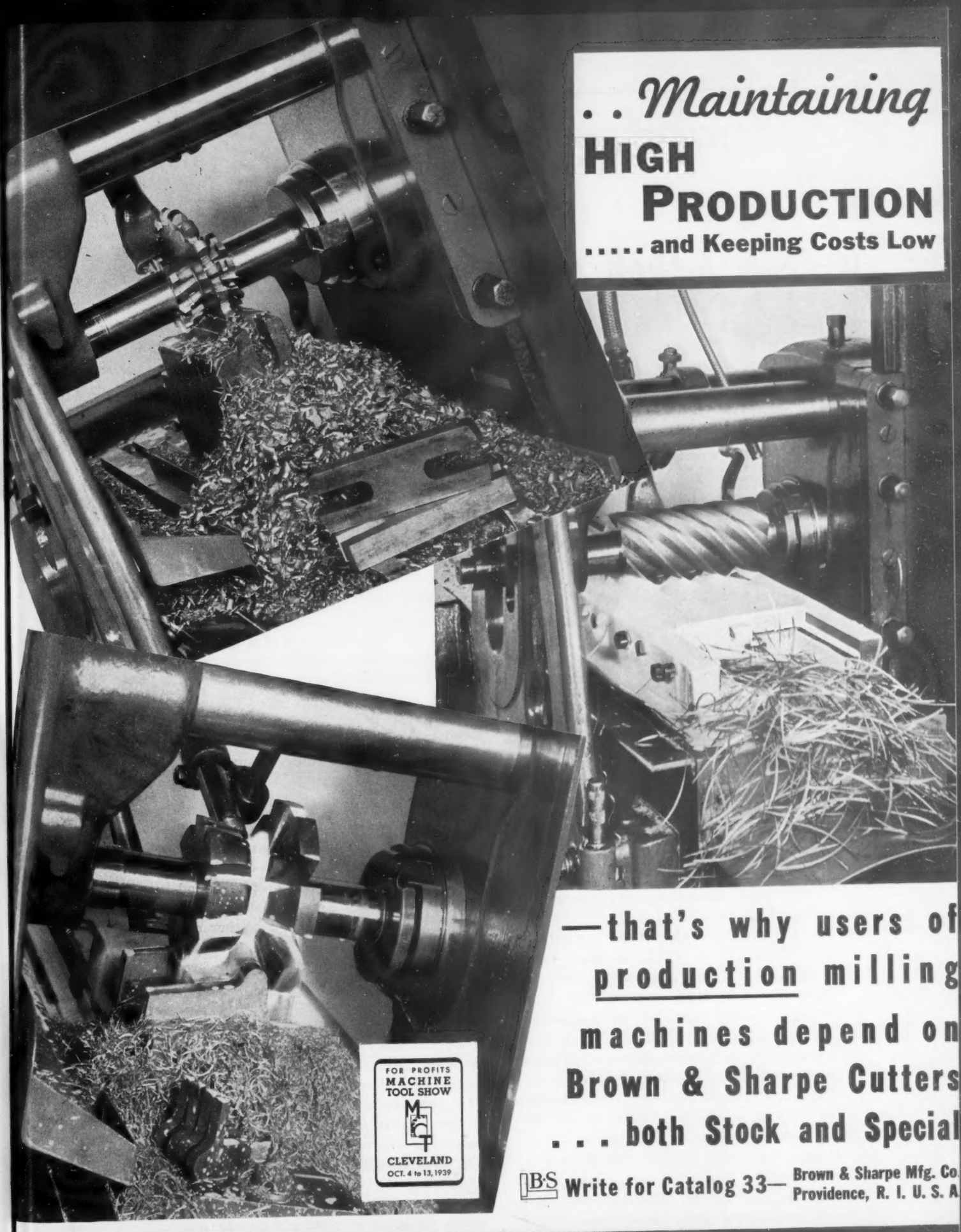
*Estimated.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
July 8	42,784	25,375
July 15	61,610	42,010
July 22	47,420	32,070
July 29	40,595	30,390
Aug. 5	28,250	14,771

†Comparable week.

	Week Ended	
	Aug. 5	July 29
General Motors	3,530	15,030
Chrysler	2,130	2,540
Ford	17,500	16,875
All others	5,090	6,150



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BROWN & SHARPE

Editorial

We See by the Papers

■ *MADISON, WIS.* — Petition by CIO unionists for an injunction restraining the new Wisconsin labor relations board from intervening in their strike at Allen-Bradley Co.'s Milwaukee plant was denied by federal court here.

Decision cleared the way for an action in Milwaukee circuit court by the board to enforce its recent order directing the union to end mass picketing of the plant, limit pickets to 15 at any one time, and cease intimidating nonstriking employes.

•

Washington—The partnership between the New Deal and CIO was rebuked when the senate adopted a rider to the President's lend-spend bill prohibiting campaign contributions by labor unions and fraternal organizations excepting by direct and special assessment on their members.

Union Tactics Bankrupt Builder; Food Stamp Plan Being Extended

Pittsburgh—Bankruptcy proceedings involving Gilbert-Varker Inc., builder of the Clairton housing project intended for Carnegie-Illinois Steel Corp. workers, have been started. Project, including 300 dwellings, was completed several weeks ago.

Labor troubles have been the major factor in the financial difficulties. Sabotage activities as well as exorbitant wage rates and jurisdictional disputes are blamed for the failure. These and other factors boosted the cost of the project well above the contract agreement of $1,050,000.

Significant was the wide use of steel in the houses. This itself was a sore point with the labor unions. Most members were not acquainted with these applications, bringing up disputes over the installation.

Shawnee, Okla. — The food stamp plan which up to now has been restricted to distributing food supplies to the needy on WPA is being extended to low income groups. Federal Surplus Commodities Corp. has designated every citizen of Pottawatomie county who earns less than $1000 a year as the low income group for the first trial that is to be started at once. Every member of the low income group when purchasing $1 worth of orange-colored government food stamps, good for the purchase of any kind of food at any grocery, will receive free 50 cents worth of blue government stamps redeemable in the foodstuffs in the government's surplus stock.

Leaders Must Find Grievances To Stimulate Flow of Union Dues

Detroit—Some sort of showdown will have to be made in the labor mess which affects not only General Motors but the rest of the industry as well, in one way or another. Should the GM dispute be adjusted finally, the UAW-CIO then will turn to some other unit to start another outbreak, for after all, as the automobile unions now are constituted, the only way they can prolong their existence is to keep stirring up trouble and strikes.

As the record for the past year shows, when the labor waters are calm, union members gradually lose interest and quit paying their dues. Then the only way to whip them back into the fold is to manufacture grievances at some plant, throw a picket line around the gates, call for a federal labor conciliator and start a protracted series of so-called negotiations, hoping that in the meantime the company against which the strike is called will give in to its demands to avoid crippling its business.

The BUSINESS TREND

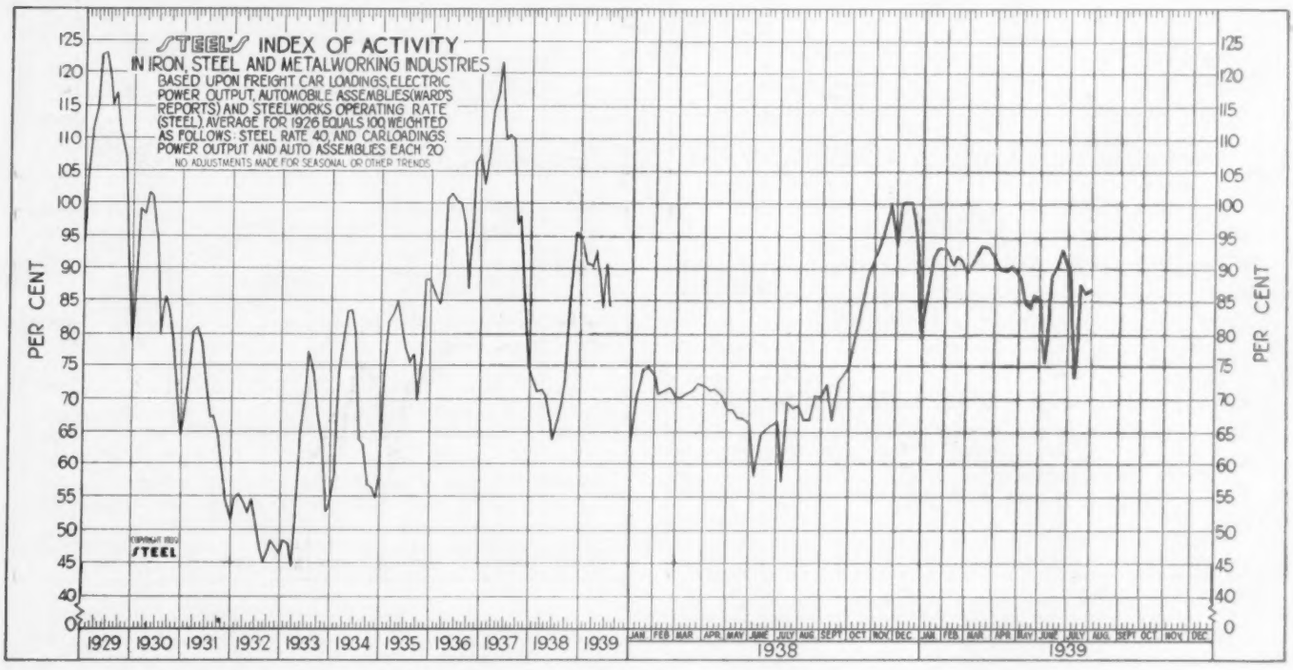
Most Business Indicators Resist Seasonal Influences

■ REFLECTING the holiday interruption early in July and the seasonal decline in automobile production throughout the month, STEEL'S monthly index receded from the 90.9 level of June to 83.7 for the month of July. The July index figure compares closely with 83.4 recorded during May, and is well above the monthly index figure of 66.2 recorded in July, 1938.

Substantial gains in electric power output and steelmaking operations more than offset a further sharp seasonal decline in automobile production during the week ended July 29. As a result STEEL'S weekly index advanced 0.8 of a point to 86.8. This compares with 86.0 in the preceding week and 69.0 in the comparable week last year.

Steelmaking operations continued their sharp advance during the week ended July 29, to reach the 60 per cent level. In three weeks from the Fourth of July holiday week the national steel rate has advanced 18 points or a gain of 43 per cent. A leveling off at the 60 per cent level is expected, but is considered only temporary by some. Part of the present ingot production is in anticipation of future requirements, primarily from the automotive industry. However, miscellaneous consumers are providing strong support to the recent level of operations and are partly responsible for the sharp upturn that got underway early last month.

As anticipated, automobile output again declined seasonally during the week ended July 29 to 40,595 units,


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100. WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20.
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS.
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity gained 0.8 points to 86.8 in the week ended July 29:

Week ending	1939	1938
May 13	84.2	67.2
May 20	86.6	67.1
May 27	85.4	66.5
June 3	75.9	58.1
June 10	88.2	64.4
June 17	90.9	65.2
June 24	93.0	66.0
July 1	91.0	66.5
July 8	73.4	57.1
July 15	87.8	69.9
July 22	86.0	68.7
July 29	86.8	69.0

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.7	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

compared with 47,420 in the preceding week and 30,390 in the comparable week last year. Until new model operations turn the trend upward during the latter part of August, little improvement in automobile production can be expected.

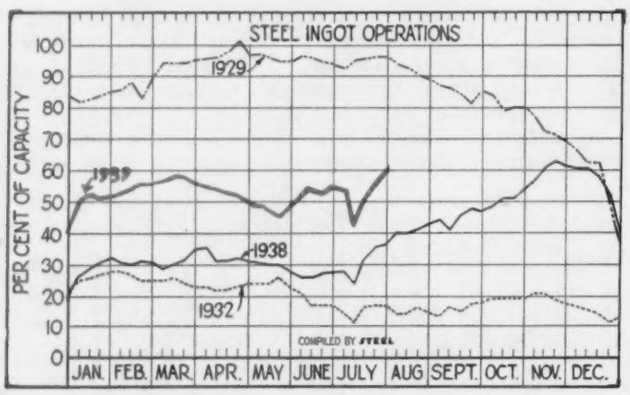
Electric power output during the week ended July 29 was less than 1 per cent under the all-time high of 2,362,947,000 kilowatt-hours recorded during the week ended Dec. 24, 1938. This would indicate that power output during the fourth quarter, when seasonal demand is at its peak, will exceed by a wide margin all previous records. Electric power consumption in the latest week totaled 2,341,822,000 kilowatt-hours, against 2,093,907,000 kilowatt-hours in the comparable 1938 week.

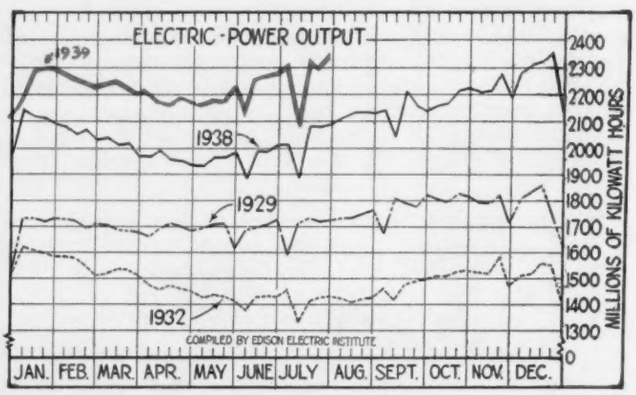
VOLUME OF FOREIGN TRADE DECREASES

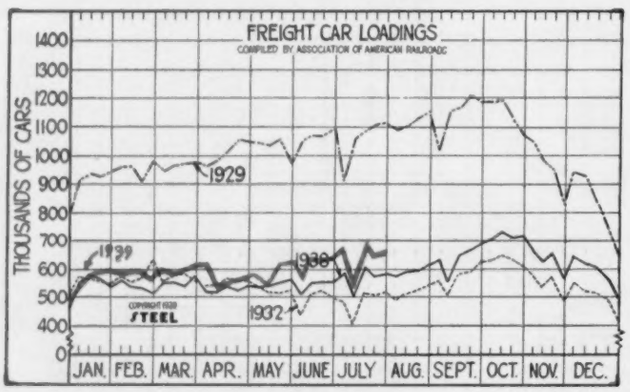
Volume of foreign trade in the United States receded seasonally from the level held throughout May. However, exports during June were for the first month in over a year able to show an increase over the year previous. June exports totaled $236,058,000, compared with $249,259,000 of May and $232,686,000 in June, 1938. Imports of $178,953,000 during June declined sharply from the unusually high level, compared with recent months, recorded during May of $202,505,000. Compared with April imports of $186,300,000, the June volume of imports do not appear out of line. The export balance of $57,105,000 recorded during June, compares with one of $86,857,000 in June, 1938.

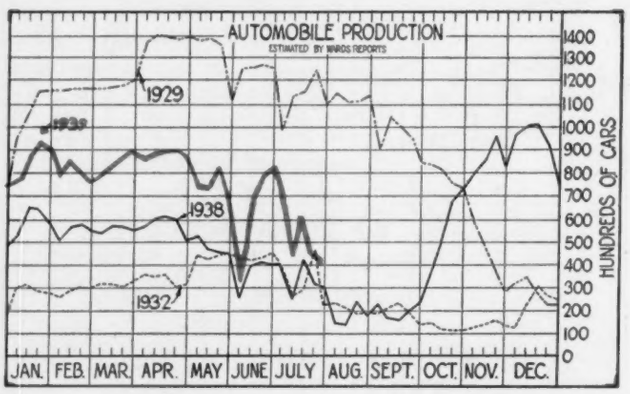
For the first six months exports of $1,415,427,000 were 11 per cent smaller than in the comparable 1938 period and also represented a decline of 8 per cent from the total shipments in the same period 1937. Imports for the first half of $1,094,563,000 were 14 per cent higher than in 1938, but were below the corresponding periods of 1937 and 1936. The export balance in the first six months of $320,864,000 was little more than half of the exceptionally large export balance of $629,833,000 in the like 1938 period.

Iron and steel foreign trade did not follow the general trend during June. Including scrap, June exports totaled 588,856 tons, against 532,641 tons in May and 312,021 in June, 1938. Imports during June, also including scrap, amounted to 33,623 tons, compared with 28,142 in May and 15,887 tons in June last year. Exports in the first half of 2,712,227 tons were slightly lower than the 2,915,679 tons exported during the same period last year.

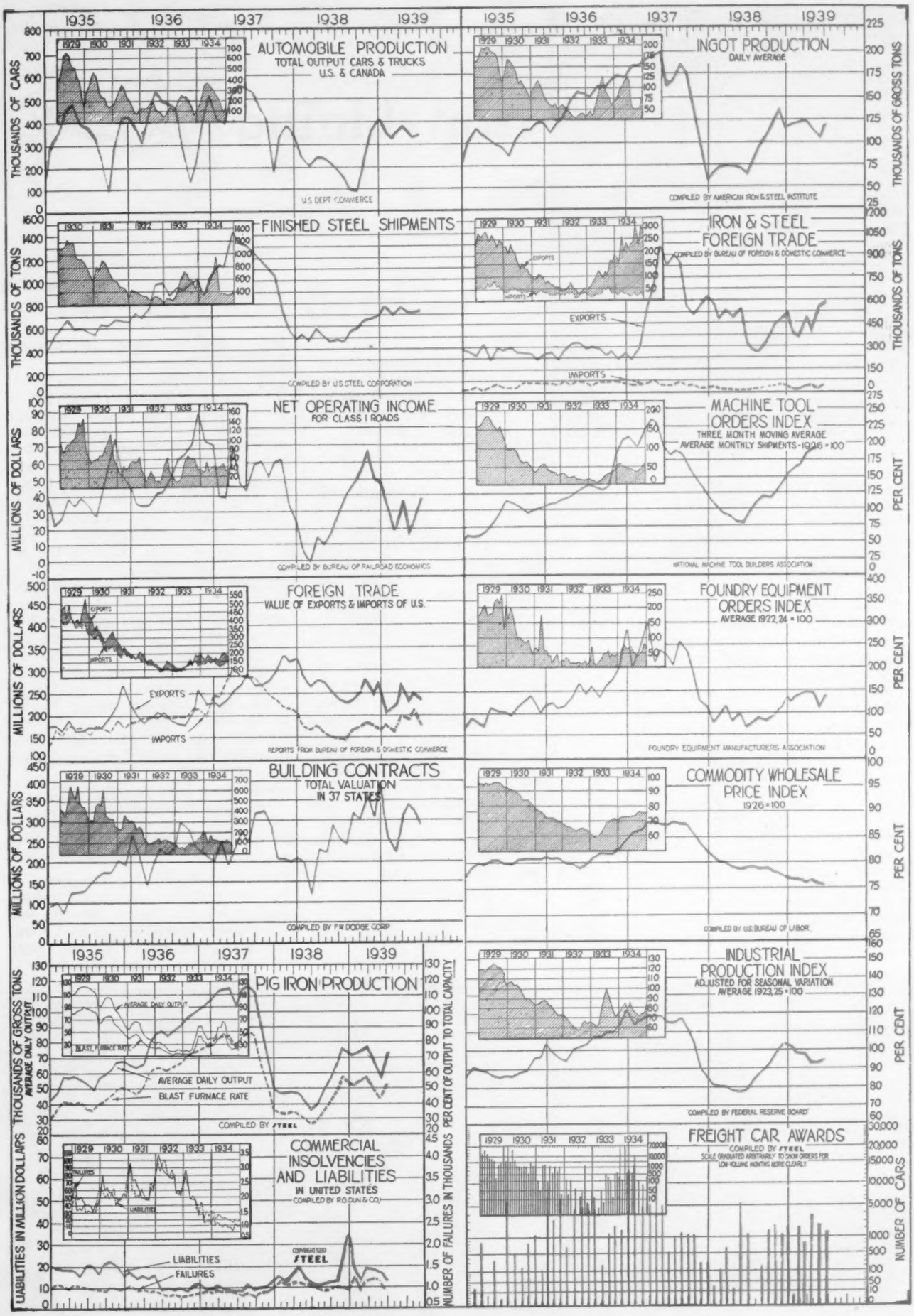








Week ending	Steelworks Operating Rate Per Cent 1939	1938	1932	1929	Electric Power Output Million KWH 1939	1938	1932	Freight Car Loadings Thousands of Cars 1929	1939	1938	1932	1929	Weekly Auto Output 1939	1938	1932	1929
Apr. 15	51.5	32.0	22.0	96.0	2,171	1,958	1,480	1,697	548	538	567	972	88,050	62,021	35,778	140,822
Apr. 22	50.5	32.5	23.0	98.0	2,199	1,951	1,469	1,709	559	524	562	1,004	90,280	60,563	30,672	140,290
Apr. 29	49.0	32.0	24.0	101.0	2,183	1,939	1,445	1,700	586	543	554	1,052	86,640	50,755	31,121	139,732
May 6	49.0	31.0	24.0	97.0	2,164	1,939	1,429	1,688	573	536	534	1,050	71,420	53,385	43,899	140,672
May 13	47.0	30.0	24.0	97.0	2,171	1,968	1,436	1,698	555	542	517	1,048	72,375	47,415	42,587	138,541
May 20	45.5	30.0	25.5	96.0	2,170	1,968	1,435	1,704	616	546	516	1,046	80,145	46,810	43,470	139,528
May 27	48.0	28.5	23.0	95.0	2,205	1,973	1,425	1,705	628	562	521	1,061	67,740	45,120	45,121	136,032
June 3	52.0	25.5	21.0	95.0	2,114	1,879	1,381	1,615	568	503	447	972	32,445	26,980	44,116	111,372
June 10	53.5	25.5	17.0	96.5	2,257	1,992	1,435	1,690	635	554	502	1,055	65,265	40,175	43,491	125,307
June 17	52.5	27.0	17.0	96.0	2,265	1,991	1,441	1,699	638	556	518	1,069	78,305	41,790	44,121	126,125
June 24	54.5	28.0	17.0	94.0	2,285	2,019	1,440	1,723	643	559	499	1,096	81,070	40,918	45,110	125,736
July 1	54.0	28.0	14.5	93.0	2,300	2,015	1,456	1,592	666	559	480	909	70,663	40,945	40,291	98,746
July 8	42.0	24.0	12.0	95.0	2,078	1,881	1,341	1,712	559	501	416	1,065	42,784	25,375	26,560	113,586
July 15	50.5	32.0	15.5	95.5	2,234	2,084	1,415	1,727	674	602	504	1,079	61,610	42,010	29,870	115,075
July 22	56.5	36.0	16.5	96.0	2,295	2,085	1,433	1,723	657	581	502	1,101	47,420	32,070	46,375	123,512
July 29	60.0	37.0	16.5	96.0	2,342	2,094	1,440	1,725	660	589	511	1,104	40,595	30,390	22,461	110,163


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
THOUSANDS OF CARS
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
THOUSANDS OF GROSS TONS
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
THOUSANDS OF TONS
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MILLIONS OF DOLLARS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
PER CENT
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
COMPILED BY STEEL
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Iron Lining *Fused*

Fig. 1—An operator places a preheated steel band into the chuck of the spinner as it moves around to the pouring station

■ PRODUCTION of 20,000 to 25,000 automotive brake drums per 8-hour shift, current practice at the new plant of Centrifugal Fusing Co., Lansing, Mich., involves an interesting and unusual series of metal fabricating, melting, centrifugal casting and handling operations. The drum, sold under the tradename of Centrifuse, is known as a combination type, with an outer shell or backing of pressed steel on the inner surface of which a high-grade gray iron braking surface is cast centrifugally in such a way that it fuses into the steel shell. Drums are made in double units and cut apart after the braking surface is cast into the shell.

This type of drum was developed by Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., and the Motor Wheel Corp., Lansing, Mich. The fusing process and much of the machinery used in the fusing operations, as well as some of the steel fabricating methods and equipment, are covered by patents of the two companies.

Fusing operations on a production basis were started early in 1931 at the Muskegon plant of Campbell, Wyant & Cannon. A description of the process appeared in STEEL, March 14, 1932, page 31. Originally the pressed steel ring shells for the drum were manufactured by the Motor Wheel Corp., at Lansing, then trucked to Muskegon for fusing and the fused drums hauled back to Lansing for further fabrication.

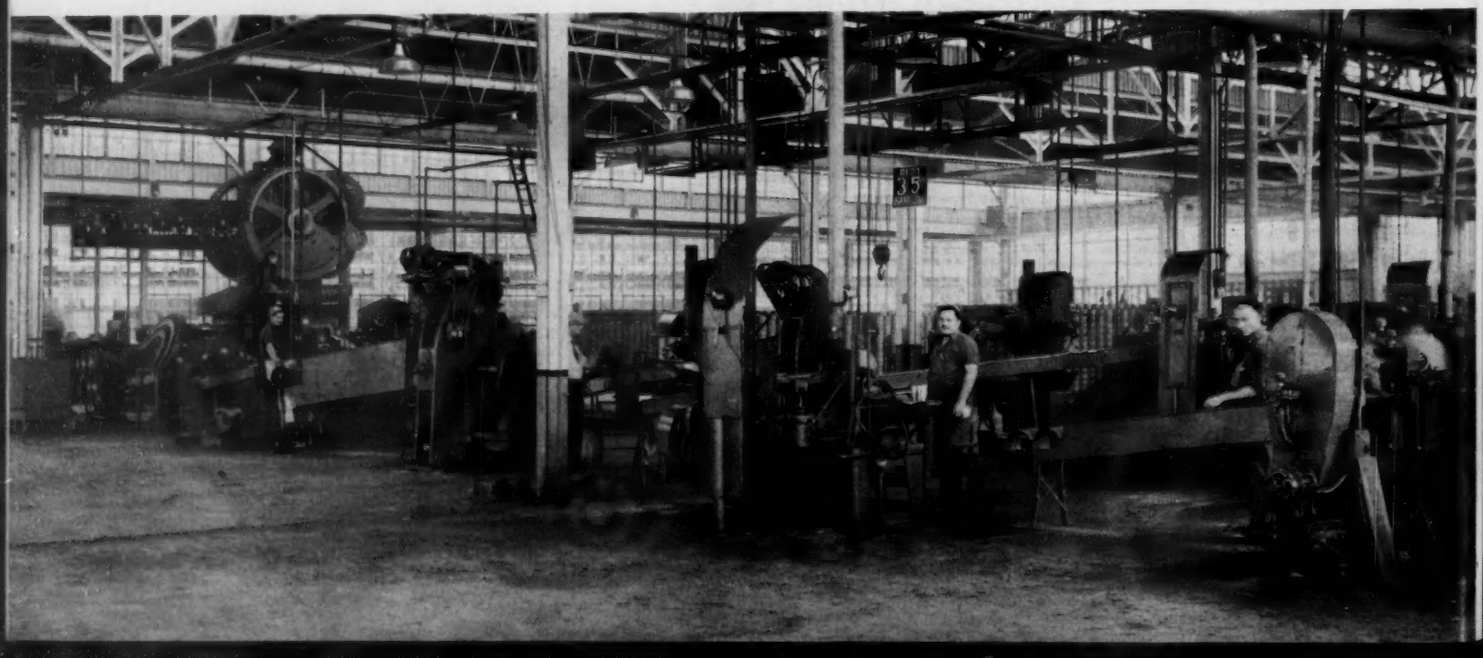
To effect a reduction in this handling cost and to institute other manufacturing economies through new methods and equipment, Motor Wheel Corp. erected a new foundry at Lansing in 1936 and leased that plant to the Centrifugal Fusing Co. which took over the fusing operations in the new plant under licenses from Campbell, Wyant & Cannon. Fusing operations were started in the Lansing plant in the fall of 1937 and at that time were discontinued at Muskegon.

Normal output of the new plant is 10,000-12,000 double rings per 8-hour shift, each with average weight of 15 pounds. Naturally sizes vary somewhat, ranging from 2-inch flange by 10-inch diameter for passenger car use up to 3-inch flange by 16-inch diameter for trucks.

In describing the manufacture of these drums, it perhaps will be best to follow a drum through the sequence of operations involved, starting first with the pressed steel backing and then into the foundry phases. The backing material is hot-rolled steel strip, purchased in flat form and accurately sized as to length and width. For the smaller drums, 16-gage steel is used, and thickness ranges on up to ⅛-inch for the larger truck drums.

Each strip is of sufficient length to make two double drums. First step is to shear it into two pieces, after which each is passed through a set of rolls which form it to cir-

Fig. 2—Strip steel is fabricated into drum shells on this machine line. Operations performed in sequence from right to left are: Rolling the strip into a shell, electric welding the joint, scarfing, expanding, rolling the rib, sizing in an upsetter, and washing



Centrifugally To Steel Brake Drum Shells

By A. H. ALLEN
Detroit Editor, STEEL

Fig. 4—Molten iron from the electric furnace is transferred quickly to the runner box of the spinner. Note in the foreground the cam arrangement for closing the door of the spinner and tilting the runner box

cular shape. The circular shape then is passed to the next machine in the fabricating line where the ends are electric welded along the seam. The weld is scarfed on both sides by a special machine, following which the piece is trued up for roundness and then expanded slightly before being rolled to obtain the proper section. A typical section embodies a single rib about ½-inch deep near what becomes eventually the outer edge, and a flanging over of the inner edge to permit subsequent drilling for attachment of the hub and backing plate.

In rolling the section, it is observed that no drawing of the steel takes place and the steel section is maintained uniform across the full width. After rolling, the drum is upset to within 0.001-inch on the diameter and is then washed by rolling through an inclined washing chamber to which a mixture of steam and alkaline cleaner is admitted under pressure. The drums then are ready to be trucked to the adjacent foundry building where the cast iron braking surface is applied. Two lines of machines, shown in Fig. 2, are operated on forming the steel drums, each with capacity of 3000 pieces per 8 hours.

The foundry division proper is one of the few foundries in the world which has no coreroom, no molding machines, sand handling systems or related equipment. Iron requirements of 75-90 tons per day are supplied by two alternately operated 54-inch cupolas with auxiliary hot blast

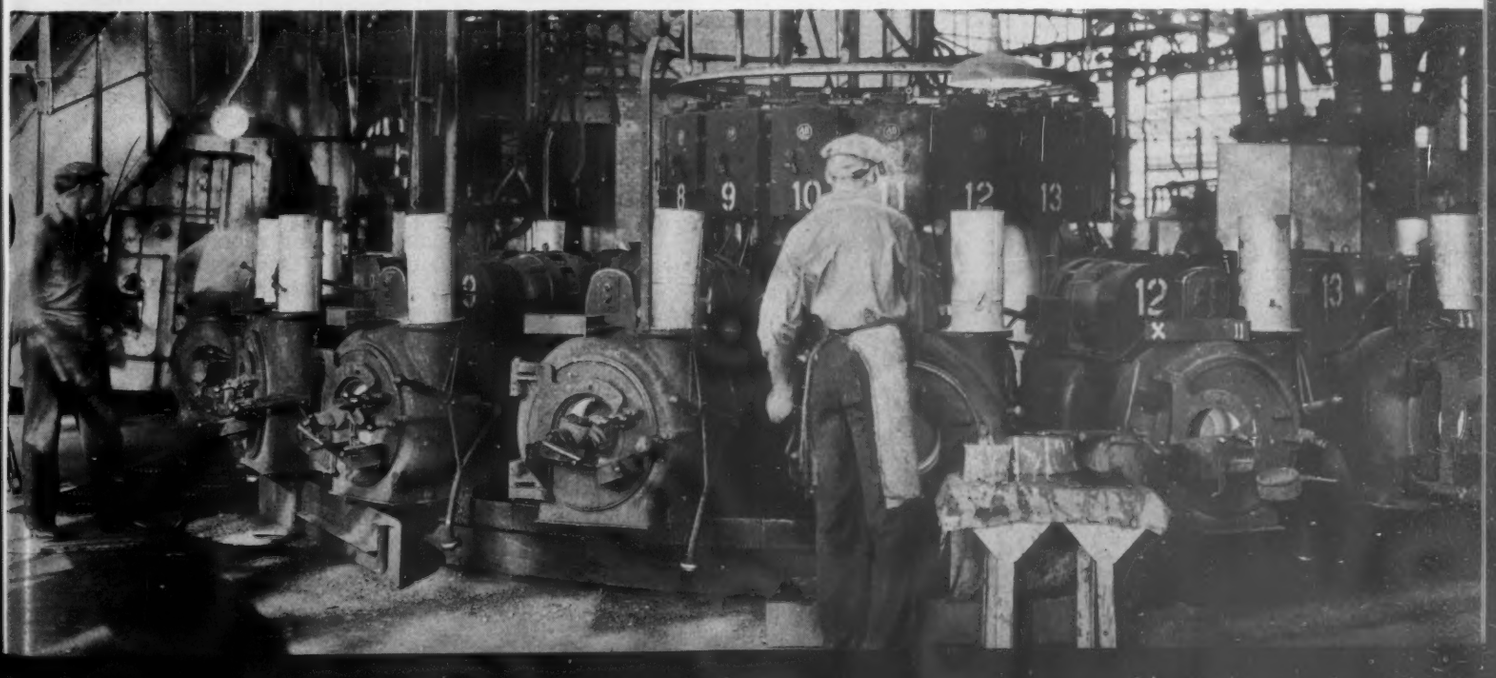


Fig. 3—General view of the turntable unit, with 18 spinners, which makes one revolution every 3 minutes. Spinners are air cooled by fan blades cast integrally with the rotating element

equipment supplied by the Whiting Corp., Harvey, Ill. The hot blast is stoker coal fed.

Charge is made up of coke, pig iron, steel plate clippings, foundry returns and a percentage of briquetted borings. Briquets are 4 inches in diameter, weighing 9 pounds, produced in an 1800-ton briquetting press manufactured by the Milwaukee Foundry Equipment Co., Milwaukee. The briquets are produced at a rate of about 550 per hour. The press has hopper feed from outside storage bins, and is of the double-acting type, the charge being given an initial squeeze by two hydraulic cylinders on the side, followed by the action of the main center cylinder. A 125-horsepower motor drives a pump operating at 2000 pounds per square inch pressure to power the press.

Borings are mixed with a small percentage of soda ash to offset the sulphur content of any cutting oil which might cling to them. The briquets finally are given a thin coating of cement to prevent oxidation before they reach the melting zone in the cupola. Sufficient storage space is available for about 60 days' requirements of cupola charging materials. Hoppers are provided into which coke, pig iron, briquets, limestone, return scrap, etc., are placed by crane before being loaded into the charging bucket.

These hoppers discharge through central spouts into a 1-ton charging bucket supported by a charging car on a scale platform. Briquets are handled into this bucket by belt conveyor from one hopper and a vibrating apron from another hopper. The bucket is moved along a track to either of the two cupolas being operated; then is hoisted by overhead crane to a wishbone at the top of the cupola where the bottom drop is actuated and the charge admitted to the cupola.

Unusual feature of these melting units is the use of water jackets around their circumference at the melting zone. These jackets, of seamless welded steel, are curved to fit the contour of the inner cupola wall. They are about 3 inches thick, 30 inches high and 24 inches wide. Seven separate jackets or coolers are used in each cupola, each with separate water intake and discharge pipelines. Each discharge pipe is fitted with thermostatic control so that the degree of cooling can be regulated through the rate of flow of water in the jackets. The jackets are suitably finned on the inside so that maximum flow of water through them will be obtained, and the discharge water from the cupola is held at around approximately 120 degrees Fahr.

Primary advantage of the use of water jackets, which are positioned so their lower ends are just above the tuyeres, appears to be savings achieved on cupola refractories. Before the cupolas are charged, the jackets are covered with 1-inch thick splits of firebrick, laid up in the usual way. This is the only brick which needs to be renewed, after the bottom is dropped at the end of a run, whereas ordinarily without water jackets as much as 11 inches of firebrick may be consumed. Further, the use of water jackets makes possible much more uniform distribution of heat through the circumference of the cupola, and permits the cupolas to be run continuously for as long as 7 days without dropping the bottoms.

However, at this plant where comparatively high-temperature iron is being melted in conjunction with the hot blast equipment, it is the practice to drop bottoms at the end of each day's run. By doing this, it is possible to rebrick and have the cupola ready for operation in only 2 hours. Incidentally, the material left in the cupola after a day's run is comparatively clean and easily disposed of, primarily as a result of the use of water jackets. Volume of hot blast air, averages 5800 cubic feet per minute at 400 degrees Fahr.

Iron is tapped at 2750-2800 degrees Fahr. into a common spout serving both cupolas and leading to a 4-ton

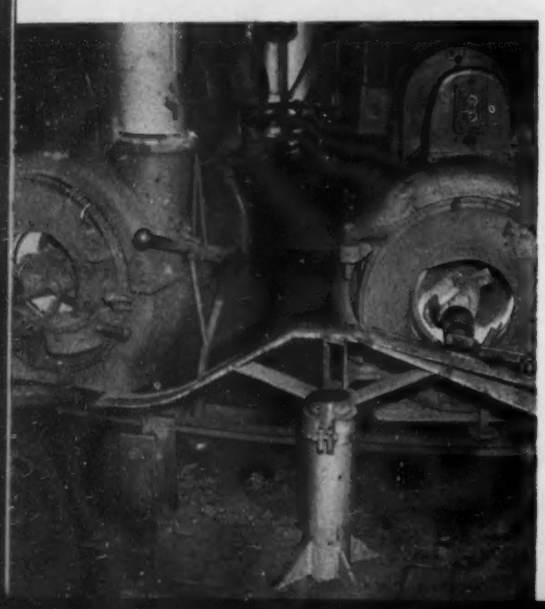


Fig. 5 (Upper left)—Coating of liquid flux is applied to steel shells before iron is spun on inner surface. Preheating furnace is in background. Fig. 6 (Upper right)—The fluxed steel shells roll in two lines down an inclined-hearth, gas-fired preheating furnace before the spinning operations. Fig. 7 (Lower left)—Here the runner box is tipped to spill the iron into the rapidly rotating drum

heavily insulated forehearth ladle which can be tipped manually. This ladle has about 8 inches of firebrick in sidewalls and is partially covered on top. Iron is desulphurized in this ladle, about 5 pounds of purite being added for each ton of iron tapped for the purpose of holding sulphur content to a maximum of 0.10 per cent.

From the forehearth ladle, molten iron is poured into a 2000-pound transfer ladle which carries the metal about 25 feet to an electric furnace with 2-ton cold melt rating, but accommodating about 4 tons of molten charge. That duplexing unit has three 6-inch electrodes and is the standard type of electric furnace supplied by the Pittsburgh Lectromelt Furnace Corp., Pittsburgh.

Iron is charged and tapped practically continuously in the unit, being tapped from the opposite side of charging. Temperature is brought up to the range 2850-2900 degrees Fahr. with 30-minute laboratory checks being made on analysis to hold carbon within the range 3.55-3.65 per cent, silicon within 2.12-2.24 per cent, manganese 0.85 per cent and chromium 0.20 per cent. Some carbon additions are made in the electric furnace, and infrequently some silicon.

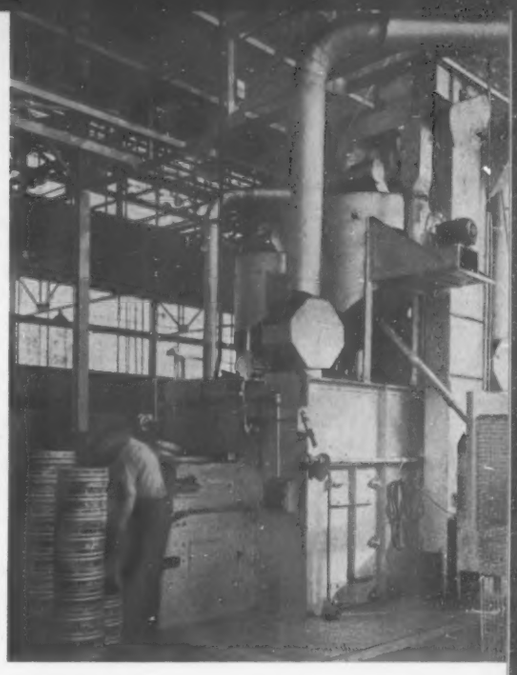
The electric furnace is located adjacent to two 22-foot turntable units, each provided with 18 spinners, as the centrifugal casting units are termed. Each spinner embodies a collet-type chuck of alloy iron with steel backing, on a horizontal spindle driven by a 7½-horsepower motor. Heavy cast-iron doors, hinged at the side, cover each chuck and by suitable cams are arranged to open and close at the proper point on each cycle of the turntable to permit loading a steel drum and unloading the spun drum.

The turntable makes one cycle every 3 minutes, and only five men are required to handle all operations on each table—two for filling runner boxes with iron, one for loading drums, one for unloading drums and one for cleaning chucks and runner boxes.

Runner boxes are atached to the doors of the spinner units and are set to hold exactly the proper amount of iron required in the drum, held within 0.1-pound. Operators with small ladles take iron from the electric furnace and pour it into the runner boxes, as shown in Fig. 4. Any excess iron drains into overflow pots attached to each runner box. As soon as the runner box has been filled, cams lock the doors on the spinners and tip the contents of the runner box into the chuck, which at this instant has just started to spin. Speed of rotation is approximately 900 revolutions per minute, or a peripheral speed of 3400 feet per minute.

After the table has traveled the distance of about two units, another set of cams opens the doors of the spinners so that the chucks will not become overheated. At this point the power is automatically shut off the spinners and they are allowed to drift until the table rotates the distance of about three more machines when the spinners are braked to a stop. An operator removes the drum with its cast inner surface and hangs it in an overhead chain conveyor which travels through a hooded cooling chamber and then back and forth across the roof of the building, eventually descending to the cleaning department after traversing a total of 2000 feet.

Meanwhile an operator cleans out the chuck from which the hot drum was removed, cleans out the runner box and coats it with plumbago preparatory to the next charge. These boxes are of refractory material pressed to shape and usually will



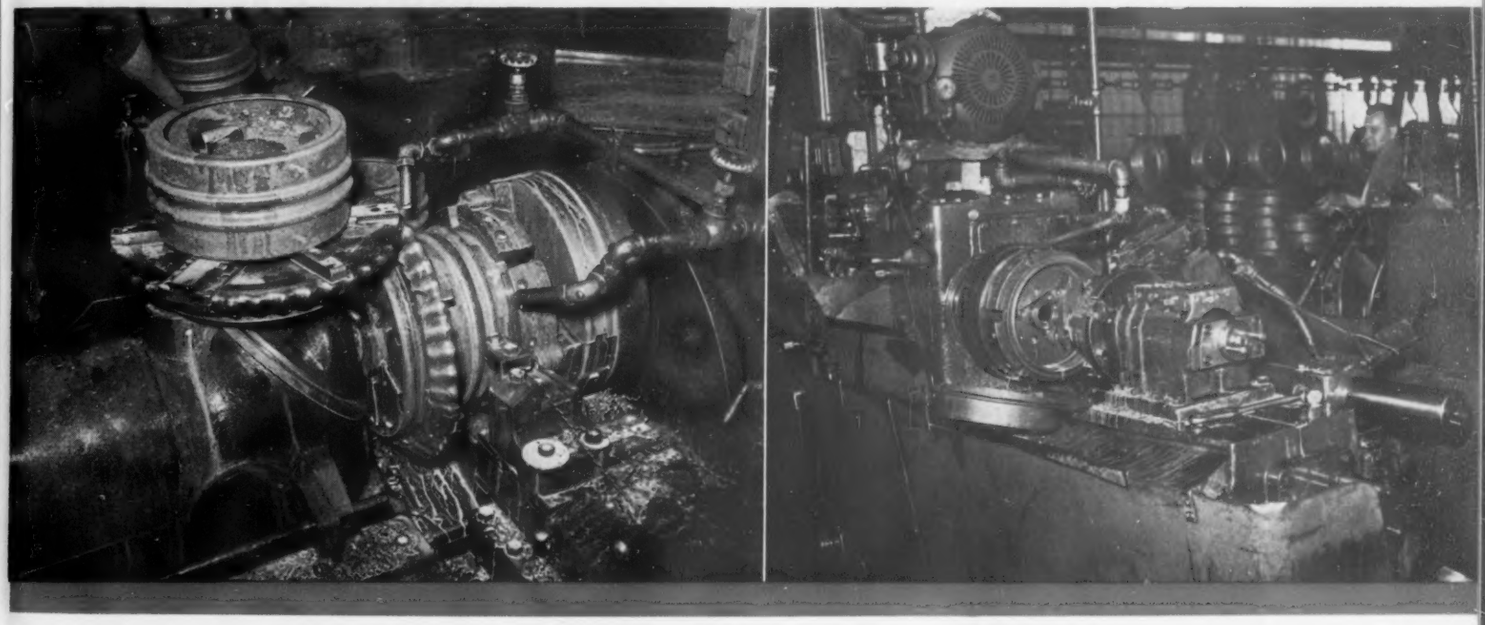


Fig. 8 (Lower left)—Double drums are split into single drums on stub lathes, one operator handling two machines. Capacity is 120 single drums per hour per machine for the 10-inch size. Fig. 9 (Lower right)—In boring the drums 3/32-inch of stock is removed by tantalum carbide tools. One operator controls two lathes, each of which bores 90 drums per hour. Fig. 10 (Upper right)—Final cleaning is performed on airless abrasive blasting equipment which scours inside and outside surfaces of about 700 drums per hour

last for about one full day's production. This means about 160 fillings, since normal production speed is one revolution of the table every 3 minutes. This rate also means that the two ladle men on each turntable must fill a runner box every 10 seconds, since there are 18 spinners on the table.

Fig. 1 is a closeup of an operator placing a preheated ring in the chuck and gives a good idea of the construction of spinner, door, chuck and runner box. Fig. 7 is another closeup of the spinner and chuck. Notice the construction of the spinner housing, with vent pipe at the right. The spinner spindle is provided with a number of vanes which travel inside this housing and serve to air cool the device, supplanting a former water cooling system. Notice also the chuck is made in eight segments which are closed and released automatically and hydraulically.

Gas Burners Preheat Chucks

Fig. 3 shows a general view of the turntable, operator in the foreground cleaning the runner box. Suspended above the turntable at a height of about 10 feet, but not to be seen in the illustration, is a preheating device consisting of a ring of gas pipe equipped with burners. Before the table is started, this is lowered to the level of the spinners and the burners are directed into the 18 chucks to preheat them.

These chucks must be maintained dimensionally with utmost care during regular production. Chucks are constantly checked for size but only removed when the circumference gages differently than is permitted by allowable tolerances. It is quite simple to remove and replace a chuck, and ordinarily can be done without losing more than one cast in the chuck, the work being done while the table rotates.

A complete cycle of casts also is weighed periodically, and, as mentioned before, if any drum exceeds the allowable limits of 0.1-pound suitable adjustment must be made to the runner box to correct the deficiency or excess in iron.

Another essential in this process is a 100 per cent fusion between the cast iron and the steel band. To insure this, special precautions are taken with the steel bands before they are chucked. First they are rolled through an inclined preheating oven which raises the temperature to 400 degrees Fahr. As the bands roll out of this oven a spray gun is swung into position and the inner surface sprayed with a flux, as shown in Fig. 5. This flux is a mixture of 70 per cent soda ash and 30 per cent borax with sufficient water to produce a suitable consistency for spraying. An operator then transfers the fluxed bands to a seven-compartment gravity chute which carries them to the charging end of a gas-fired preheating furnace through which they travel in a double line.

Preheating temperature ranges from 1200-1700 degrees Fahr., depending upon the size of the bands being produced. Exit from the preheating oven is sealed and as the bands are required in the spinners, a door is tripped and a drum quickly lifted out and placed in the spinner chuck. Fig. 6 shows the preheating oven, with an operator starting a drum into the charging end. This is a muffle-type furnace, with gas burners firing both over and under the muffle. Alloy steel rails are placed on the sides and bottom of the muffle and the shells ride along them vertically.

After traversing the 2000-foot cooling conveyor the drums with linings cast in are carried through automatic shotblast cleaning equipment, Fig. 10, which is provided with two adjacent rubber belts, one traveling at a higher speed than the other. By this means, when the drums are placed flat, half on one belt and half on the other, they are rotated as they pass through the shotblast, thus exposing all surfaces to the action of the abrasive. One of these cleaning machines, three of which are operated, will handle 5000-6000 double drums per 8 hours. These cleaning machines are wheelarator units supplied by the American Foundry Equipment Co., Mishawaka, Ind.

Incidentally, a duplicate of the electric furnace and turntable line just described is installed, primarily for production on larger size drums where the quantities made are not so large. The electric furnace is rated at 1000 pounds cold melt capacity; the two turntable units comprise 18 and 12 spinners, respectively.

Comfortable Working Conditions

Special attention has been paid to the comfort of operators working on these turntable units. Pits covered with steel grating house ventilator fans which direct a constant stream of outside air over operators working on the turntables. The building itself is practically all glass along both sides, and extends high enough to provide ample ventilation above as well as to house the stretch of cooling conveyor which travels back and forth near the roof, with wire mesh guards completely covering the space below them.

Final operations on the drum before drilling and finish machining include a light squaring up operation in a press, cutting apart on a stub lathe, Fig. 8, with right angle fixture by means of which one drum can be chucked while another is being cut. One man handles two of these machines, production on the 10-inch size averaging 60 double drums or 120 single drums per hour per machine. Stellite-tipped cutting tools are used.

Next the cut drums are given an initial set by compressing, then are bored out on a lathe removing 3/32-inch of stock from the inner surface, and finally expanded to finish size. The boring operation, shown in Fig. 9 and performed with tantalum carbide tools, is run at 280 surface feet per minute and tools give 600 pieces between grinds. Rockwell B hardness of the cast surface ranges from 89 to 98, with 94 considered ideal.

Reports Progress In Steel Highways

■ INDICATING progress in the study of steel highways is a report just issued by the American Institute of Steel Construction, New York, describing tests made on a thin asphaltic roadway surfacing for battledeck floors for highway bridges. A battledeck floor is a flat steel plate welded to supporting beams, and functioning as a part of the compressive area in structure.

In 1936, results of several tests in Germany, relating to thin bituminous wearing surfaces applied to steel plates, were made public. Coincident therewith there was completed at Lehigh university a series of strength tests of battledeck floor panels. Tests, performed under the supervision of the committee on technical research, American Institute of Steel Construction, were intended to furnish data leading toward the economical structural design of battledeck floors for highway bridges.

Following publication of the results of the European tests on thin coverings such a material was obtained and applied to the full-size battledeck panel used in the Lehigh stress distribution tests, and subjected to traffic and weathering in a roadway.

To the battledeck floor was applied an asphaltic covering approximately ⅜-inch thick. It consisted of a mixture of crushed stone, sand, portland cement, water, and a special emulsified asphalt.

Site selected was a curve in the heavily traveled roadway leading in from the main gate of the Bethlehem Steel Co. plant at Bethlehem, Pa. Asphaltic material supplied by the Flintkote Co. was "special extratite C-13-E," an emulsified asphalt applied without heating.

After 18 months of heavy usage

(*Please turn to Page* 66)

ADVERTISING PAGES REMOVED

Welded Aircraft

New type of welded design offers cost savings of 20 per cent on large rigid airships, of 30 per cent on transport planes. Frame elements are few. The screwed-on skin takes shear loads, developed as tension, eliminating diagonal bracing

By RALPH H. UPSON
Consulting Engineer
Kay Products Co.
Detroit

■ HERE IS set forth a type of arc welded design usable in aircraft of the all-metal or stressed-skin type. All individual features proposed are tried and proven, but the particular combination has not been used. The Navy's metal-clad airship, ZMC-2, now completing its ninth year of successful service, embodies many of the physical principles involved, but owing to lack of suitable high-tensile steels and unfamiliarity with welding at that time, it was made of riveted construction.

A recent self-propelled rail car embodies a welded steel tubular frame with a stressed dural skin attached to it by hardened self-tapping screws, here advocated for aircraft because of the particular difficulty of driving rivets in this type of structure. Also, a similar type of construction has been used in lightweight motor coaches with signal success. Operation of these busses, under conditions of vibration substantially worse than anything in aircraft, has shown consistently excellent results. Unlike ordinary wheeled passenger vehicles, however, the surface skin of aircraft is subjected to the action of substantial pressure forces which must be taken into account.

Method of stiffening the surface to withstand these pressure forces is vital. This surface stiffening is usually done in one or both of two ways. Either many closely spaced, separate, flanged stiffeners are riveted inside the skin bottom as in lower portion of wing section, Fig. 1, or the skin is built up of two layers, the outer layer being of smooth sheet running from 0.010 to 0.030-inch in thickness, while the inner layer is two to three times as thick and is corrugated, top portion of wing section, Fig. 1. This method has the stiffness characteristics of the old Ford Tri-motor type construction in a direction that will do the most good, without the attendant increased surface friction. However, both these methods require a large number of rivets to fasten outside skin and inside stiffeners.

Stiffened with No Extra Weight

By the method proposed, panels as large as 7 x 16 feet of 0.010-inch, 17 St. Alclad were satisfactorily stiffened with no extra weight or added members of any kind. This is accomplished by maintaining and utilizing a pressure difference of small magnitude acting normal to the skin and always in the same direction. With this pressure difference, both calculations and tests show there will be no tendency for the skin to flutter, and that the skin will be able to carry a proportional amount of shear or superimposed compressive stress without serious wrinkling.

Theoretically and practically, as in the case of the ZMC-2, the forward speed of the ship was found sufficient to maintain the required pressure difference at all times. The airplane, with its higher speed, will be still more definitely susceptible to this type of pressure control. In the event of local damage to the skin, the general redundancy of structure serves to carry stresses around the injured spot substantially as though there were no break. This has been verified by practical experience as well as by mathematical analysis and laboratory tests.

External pressure distribution of air around a wing in flight has been studied for some time, but internal pressure has been left entirely to chance. As is well known, maximum external pressure is confined to a narrow strip along the leading edge, easily reinforced by structural means. The outside pressure drops off so fast from this point that it is quite unnecessary to have as much pressure inside. Also the pressure is so much lower on top than on the bottom, that in some cases it is sufficient to have a pressure inside such that the pressure difference on the surfaces act outward on the top and inward on the bottom.

Hence, controlling air vents are put at points where the pressure is just sufficient to insure the desired results. Scoops or leading edge vents, Fig. 3, of course give the maximum. The wing volume being small and the screwed seams relatively tight, only small intake open-

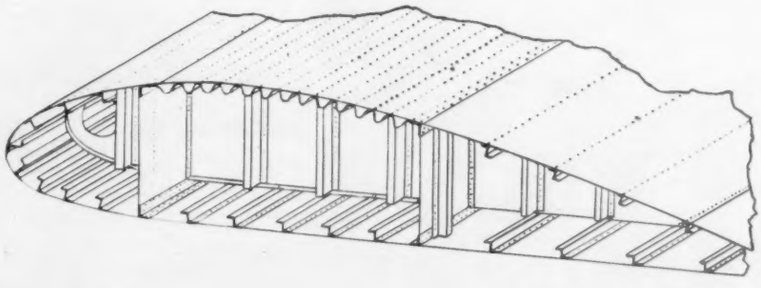


Fig. 1—Wing section showing stiffeners employed in present all-metal airplane construction of riveted 24ST Alclad material

ings are needed if properly located. Both inside and outside pressures then are generated automatically in proper proportion by effect of air speed itself and angle of attack of the wing.

This substantially simplifies the construction. In the case of a fuselage, since the section is usually nearly symmetrical, the pressure would have to be great enough for the difference always to be acting outward. If cabin is supercharged for high-altitude flight, the problem is already taken care of. If not, it is solved in the same way as for the wing, Figs. 2 and 3.

Two convenient methods, embodying the above principles, are shown for obtaining an arc-welded structure of high-tensile steel. The first is the most straightforward, consisting merely of using initially heat-treated or high-tensile stainless stock in fabrication, preferably the latter.

Stainless Steel in Wings

For purpose of illustration, the wing is chosen because it is considered to be the most important and critical part of an airplane. Here the wing beam is made up of two corrugated stainless steel flanges with lattice tubes of similar material, arc welded in place, Fig. 3. The flanges are tapered in width toward the tip. It should be noted that the corrugated flange here is used purely as a beam flange and does not support the skin. Hence it can be made relatively narrow and of substantial thickness. In this type of construction, the rib members are preferably screwed to the beam flanges.

Second method is to use unheat-treated stock to form subassemblies of such a size as to admit them to furnaces and quenching tanks readily available. These subassemblies then are heat treated after fabrication, and assembled by telescoping them together. They are secured in place by a series of "slot" welds, Fig. 4, designed to distribute the welding heat in axial lines and prevent loss of strength in the section as a whole. Rib members can be arc welded in place by similarly restricting the lines of weld with little loss of strength in the beam flange.

Naturally arc welding is ideally suited to both of these constructions since the heat produced is highly localized. In either case, there is no need for diagonal bracing in the plane of the skin since the skin is an integral part of the structure and is designed to take the shear loads, developed as tension.

The skin may be fastened either to the spars or to the ribs with almost equal structural efficiency. From aerodynamic and other considerations it is deemed more satisfactory to use the rib fastening, which can be set on a spacing up to eight times that of present stiffeners. In the case of a fuselage, it is usually more expedient to run the

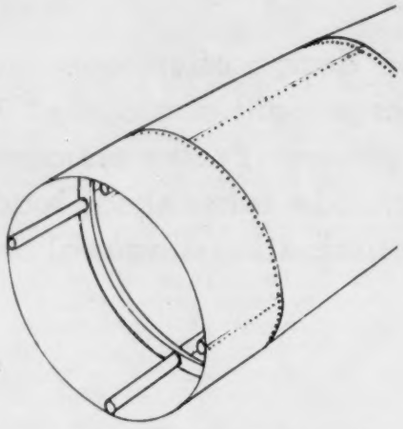


Fig. 2—Proposed arc-welded fuselage construction with skin screwed to welded tubular transverse frames

skin panels circumferentially with countersunk screw attachments to the transverse frames, Fig. 2.

Since aircraft construction companies seldom can prepare in advance an accurate estimate for the finished product, it is obviously difficult to present detailed cost analyses of an entire ship. Therefore, in preparing cost comparisons for completed units, the author draws upon his 28 years' experience in the industry. On this basis, the following percentage savings from present costs for the various sizes and types of completed units seem well on the conservative side: For a large rigid airship, 20 per cent saving; for any present all-metal air transport, 30 per cent saving; for an airplane such as the Waco Cabin or Stinson Reliant, no saving; for a light plane such as the Cub or Aeronca, 10 per cent increased cost.

Thus an airplane like the Douglas DC-4 could be built for $350,000 as compared with the reported present production cost of $500,000; a net saving of $150,000. Ships like the Waco or Stinson would cost nearly the same as at present, while a small light plane would run somewhat in excess of $100 over current costs, due to the restricted applicability of arc welding for the light framing involved.

Metal Replaces Fabric

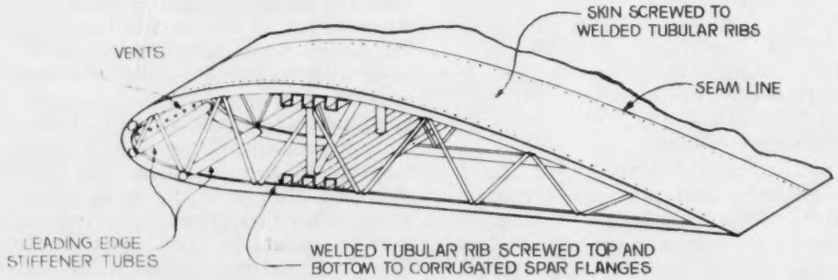
However, in these last two examples, the highly inflammable, easily damaged, fabric-covered structures will have been replaced by stronger and comparatively permanent all-metal structures of substantially the same weight. If attained by prevailing methods, this same result would cost 50 to 70 per cent more than the present ship.

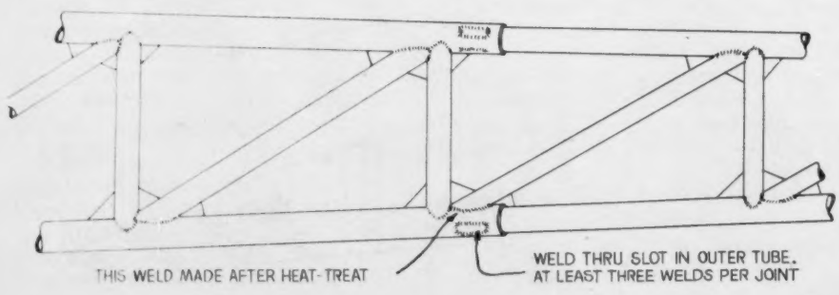
These cost estimates are for the entire aircraft, although actual savings considered are for the main structure. If arc welding also is utilized on power plant and other accessories, total savings will be still greater, of course.

Other points to consider beside cost are: Structural arrangement does not have to provide internal access to rivets; there is plenty of room for wheel wells, fuel tanks and baggage space. Also, concentrated loads from landing gear, engine nacelles, etc., are readily handled;

(*Please turn to Page* 83)

Fig. 3. (Upper)—Arc welded stainless steel wing as described here. All frame joints are gussetted. Fig. 4. (Lower)—Diagrammatic view of wing spar showing method of using heat-treated subassemblies


SKIN SCREWED TO WELDED TUBULAR RIBS
VENTS
SEAM LINE
LEADING EDGE STIFFENER TUBES
WELDED TUBULAR RIB SCREWED TOP AND BOTTOM TO CORRUGATED SPAR FLANGES



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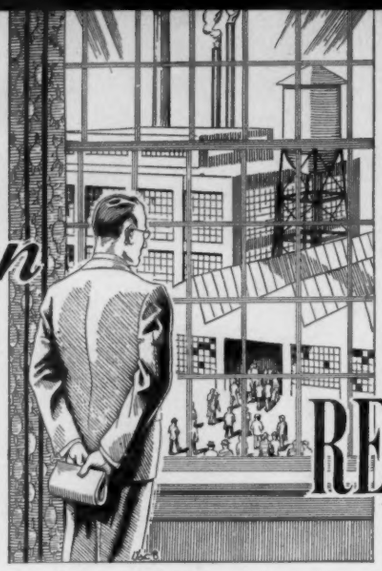


■ On the eve of his departure last winter on an extended trip overseas, Robert A. Weaver, president, Ferro Enamel Corp., Cleveland, took time to write for this Forum an unusually forthright article which appeared in the Feb. 13, 1939 issue of STEEL. It was widely quoted and aroused a great deal of favorable comment.

While abroad, Mr. Weaver continued to give much thought to unemployment. Not only that, he studied European methods of coping with it. As a result he has formulated a definite, practical program of action to meet the situation here in the United States. And so it is that we are now able to present through courtesy of *The Enamelist*, of which he is editor, Robert A. Weaver's powerful sequel to his original Forum article.

"Unemployment," says Mr. Weaver in this sequel, "is both the result and the cause of our continuous depression. IT IS PUBLIC ENEMY NO. 1. It can either be eliminated or greatly mitigated by a determined campaign carried out by the National Association of Manufacturers and by the United States chamber of commerce, co-operating with distinguished economists as well as with labor, farm and political leaders.

"These groups should work out a plan whereby the attention of the entire country will be concentrated on unemployment and kept thus concentrated until the situation is greatly improved. Business has left the problem in the hands of the government much too long and most of us are now sure that the government never will solve it."

—The Editors

■ A NUMBER of readers expressed approval of proposals made in my previous article in STEEL'S "Forum on Re-employment," which was reprinted in the June issue of *The Enamelist*. Realizing, however, that there is no possibility of a coalition government such as was suggested in that article, I therefore now propose a vigorous, sustained campaign by business organizations, with the single purpose of putting our unemployed back to work.

Unemployment is both the result and the cause of our continuous depression. IT IS PUBLIC ENEMY NO. 1. It can either be eliminated or greatly mitigated by a determined campaign carried on by the National Association of Manufacturers and the United States chamber of commerce, co-operating with distinguished economists as well as with labor, farm and political leaders.

These groups should work out a plan whereby the attention of the entire country will be concentrated on unemployment and kept thus concentrated until the situation is greatly improved. Business has left this problem in the hands of the government much too long and most of us now are sure that the government never will solve it.

It never will be solved by tinkering with our monetary system or by any plans which the government has tried or proposes to try. On the other hand, I don't agree with those industrialists who believe our continuous depression and our unemployment is primarily caused by lack of faith in the government. The depression and unemployment won't automatically be eliminated simply by electing a Republican President in 1940. The problem will be solved when the business brains of this country realize that they and they alone can do the job.

If our national business organizations meet, organize and start this battle with unemployment, they should either make a spot survey of the problem (such as Gallup could make) or should insist that congress take a real census of the unemployed. In order that we may know what the problem really is, this census should be divided to show the number of people both in our cities and in our country districts, who are out of work. These figures should be subdivided to show race, nationality, whether American citizens; age, sex, trade or profession; and average incomes during normal times.

Effort Would Inspire Nation

When the problem is really understood, then the combined forces of our business brains should go to work and stay on the job until they get results. It seems to me that newspapers, organizations and whole communities can be inspired by this movement, just as they were by Liberty Loan drives.

We surely will find one plan or another that will absorb certain types of labor. It may be that one

plan will absorb only 50,000 men, but another may take 500,000. It follows that the placing of one man on a payroll makes it easier to place a second man there. In domestic service alone there are places for hundreds of thousands of men and women, perhaps not at wages they would like to have but at least at wages which would keep them alive, healthy and comfortable.

It is quite possible that large companies like General Motors, General Electric, U. S. Steel; the insurance companies; wealthy foundations; and others; might finance tremendous housing projects or even small subsistence farms near large cities, if they could be arranged for on an efficient and equitable basis. These great organizations in this way could do great public service, stimulating business and also probably securing a much better return on their investment than they now secure from their surplus reserves.

I believe that labor leaders could be sold on the importance of radically reducing hourly wages—if their men could be guaranteed fair annual incomes from such projects.

It is quite possible that many financial, insurance, manufacturing and even retail establishments would take on thousands of apprentices—if arrangements could be made to do this on a basis that would be fair to the employers, employes and the unions involved. In Europe, for instance, restaurants and hotels give much better service because they are not restricted in hiring apprentices.

It is possible that business might recommend to congress that many more thousands of our young men be put into CCC camps where they could work on reforestation, elimination of erosion and similar projects under army engineers, with supervision by a council of noted scientists who would help plan such projects. European countries are providing millions of jobs in their armies—that being one big reason of course why Germany has no unemployment. Why can't we have a large "Youth Army" doing constructive work for our country?

Typical European Expedients

Just as examples of what might be suggested, I want to mention two more plans being used abroad. In England—instead of using parking meters—they allot certain blocks to unemployed who watch your car and thus make a living. In Germany they have a national lottery for the benefit of the unemployed and operated by the unemployed. Men in neat uniforms are allowed to sell lottery tickets in hotels, theaters, etc. I presume that they have set territories and that earnings are limited.

Assuming that under such a nation-wide campaign, there would be considered seriously and perhaps endorsed, long-range engineering projects such as trans-continental toll roads (Germany and Italy have worked this idea); loans to railroads, street car companies, etc., for modernized equipment; and that perhaps the great problem of eliminating grade crossings would be attacked; these projects should all be included in a ten or twenty year plan and they certainly should be controlled by a nonpartisan commission made up of men whose names could compel respect.

Robert A. Weaver
President
Ferro Enamel Corp.
Cleveland

A nation-wide contest for ideas to solve unemployment might produce valuable suggestions and it certainly would focus the attention of the country on the problem. It also would continuously suggest to the voters that our present administration hadn't even improved the situation.

Business can and must fight unemployment. We don't dare develop the theory that vast unemployment is with us permanently. Keep in mind that the government is going to claim next year that business interests have not been able to put people back to work and that the government will have to solve the problem by much greater government spending.

Success Hinges on Co-operation

If business takes on this task, I am sure it will succeed. If it should fail, the blame for failure can fairly be placed on the government, or perhaps on union leaders—if these agencies do not co-operate. In any case, radicals can't tell labor that business doesn't want good times and full employment.

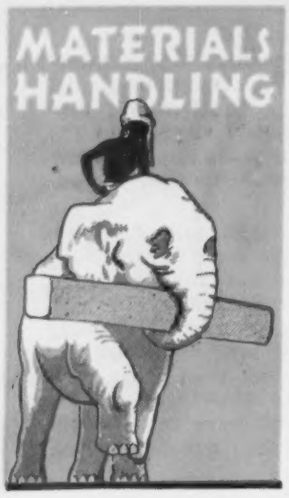
Why don't you urge your company to urge the officers of the United States chamber of commerce and the National Association of Manufacturers to declare war on our Public Enemy No. 1?

Eliminate unemployment and you create good business and good profits; you reduce taxes and unhealthy unrest among our laboring men.

Let's all push to put everybody to work who wants to work!

Dynagraph As A Weighing Machine

■ Dynagraphs are used to measure accurately the strain on the pumping rod in oil wells, recording rapidly changing loads up to 30,000 pounds. For New York World's fair, Westinghouse Electric & Mfg. Co., Pittsburgh, adapted this instrument to a small rod to indicate weights of persons up to 300 pounds. In oil well use, the stretch between two gage points on the rod is mechanically amplified 400 times. From a record produced on a moving cylinder as the pump rod is actuated, power required to pump the well, the rod loads, velocity and acceleration of the rods for any portion of the stroke, and number of strokes per minute are determined



Blast Furnace Plant

Small modernized blast-furnace plant employs gas-electric buggies to charge ore, oke being charged on belt conveyor. Arrangement solves difficult problem caused by location of new bin structure, proves highly successful in operation

By B. B. FROST
Service Engineer
Arthur G. McKee & Co.
Cleveland

■ THERE ARE still many small isolated blast-furnace plants in the United States not able to take advantage of the economies realized in operation of larger furnace plants more closely integrated with steelworks. To some extent, these smaller plants have been neglected during the furnace modernization period in the last few years.

Modernization of these smaller plants in most cases presents a much more difficult problem to the engineer than planning new or enlarged facilities for integrated plants. However, many economies not inherent to large operations can be worked out by careful study. At times, unorthodox layouts and equipment may be necessary to obtain the improvement desired. An example of such an arrangement is seen in the charging methods now employed at the Norton Furnace plant of American Rolling Mill Co. at Ashland, Ky. Originally built in 1872, this plant has recently been modernized with good results. Charging facilities are described in this article, another article telling of other improvements in this plant appeared in STEEL, July 31, 1939, p. 48.

Savings which can be capitalized to justify refinements in blast furnace equipment can be divided roughly into three major groups. Possibly one of the most important of these is reduced labor costs because credits for sale of excess gas are not readily available to the operator of an isolated furnace as he has no market. Also important is a third group which includes refinements resulting in decreased fuel consumption and increased furnace capacity. These were detailed in the article referred to above.

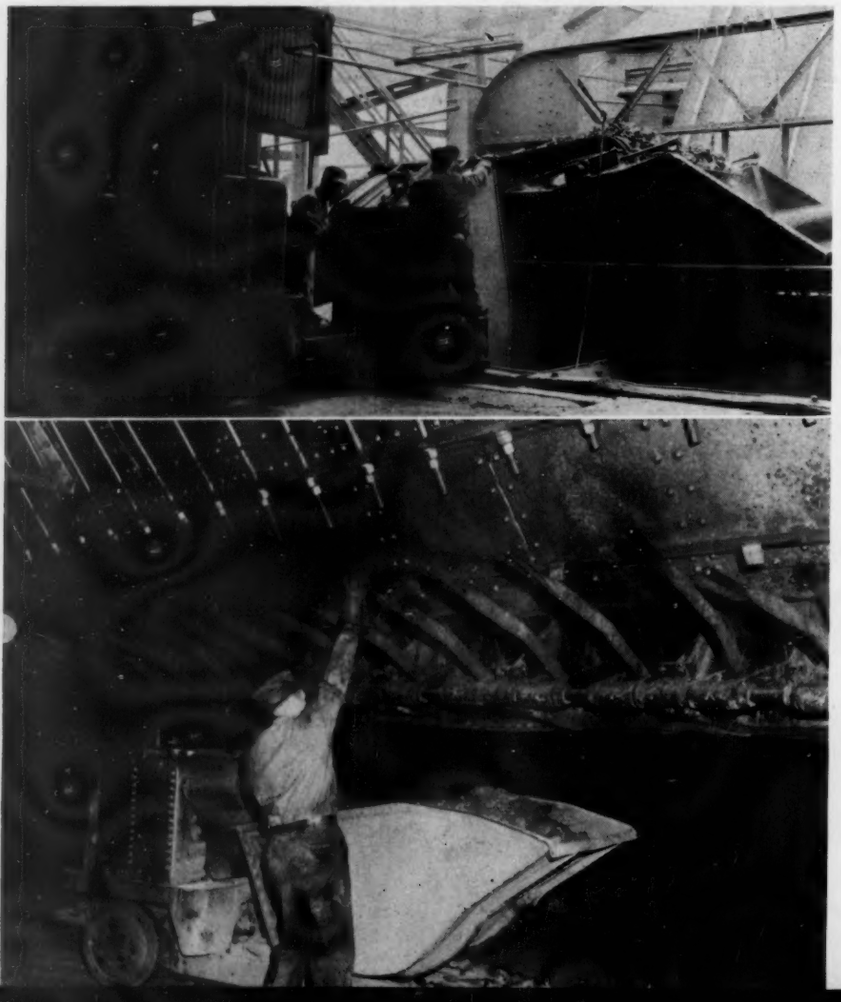


Fig. 1. (Upper)—Dump buggy loads ore into skip car. Fig. 2 (Lower)—Here a dump buggy is being filled from the bins

Stock House Rebuilt

To obtain handling economies at the Norton plant, the stock house was completely rebuilt during the modernization work. This furnace, having been hand filled, did not have the usual materials handling equipment considered necessary for large furnaces. The original wooden bin system was used when the furnace was equipped with a skip bridge and mechanical filling a number of years ago. This system had served its usefulness and was fast becoming a bottleneck, tending to slow up the furnace. Ore and stone were charged into the old hand buggies, these being handled by electric lift trucks to the bottom of the elevator to fill the furnace. Coke had been handled from a separate coke trestle on a belt conveyor.

This system was satisfactory for filling the furnace but had reached the point where major repairs were necessary, and a rearrangement of

(*Please turn to Page* 83)

ADVERTISING PAGES REMOVED

Rolling Mill Operation

Modern recording instruments make available data greatly aiding design of equipment, control of power consumption. New device measures and records fuel oil flow accurately. Thrusts on mill rolls measured and recorded. Load peaks are reduced. Numerous examples cited

By R. J. KRYTER
Esterline-Angus Co.
Indianapolis

■ WHILE a previous article discussed the instruments used on the rolling mill itself, there are a great many other instruments employed in rolling mills to serve as guides in operating the mill, to obtain design data, and to utilize most efficiently the electric power employed by the mill.

For example, modern mills use a recording voltmeter and a recording wattmeter (usually totalizing type) on the power supply for the whole mill. The recording totalizing wattmeter shows the performance of the mill as a whole. From a record of one of these meters it is possible to see each sheet go through a hot strip mill and even to determine whether the rolling is being carried out at proper temperatures or not. Also it is possible to tell when certain types of material, such as various alloys, are being rolled.

Demand Peaks Important

This record of total power consumed showing instantaneous demand peaks is increasingly important, especially with the present tendency of steel mills to supplement their locally-generated power with power purchased from utilities. There is at least one large mill that is purchasing its entire electrical requirement, and other mills are purchasing a large portion of it.

Then, there is a host of instruments that are used on individual pieces of equipment. For example, it is standard practice to have individual recording wattmeters on such important units as the high-pressure pumps that supply the water for descaling, also on slab squeezers, coilers and flying shears. In addition, speed recorders are used frequently on coilers and flying shears.

A number of units will be found equipped almost universally with speed recorders. Variable-frequency sets which operate flying shears or variable-speed motors on runout tables and pilers almost always are equipped with speed recorders.

Due to the tremendous size of motor-generator sets supplying direct current for finishing-mill motors and the vast amount of power involved, it is standard practice to have a wattmeter on the driving motor and a voltmeter across the output bus of the direct-current generators. Records made by such instruments are used to check the performance of the equipment, to locate causes of trouble when anything goes wrong, and to see that power is used most efficiently.

This is the third of a series of articles appearing in STEEL dealing with modern rolling mill control. The first appeared July 3, 1939, p. 52; the second, July 17, 1939, p. 63.

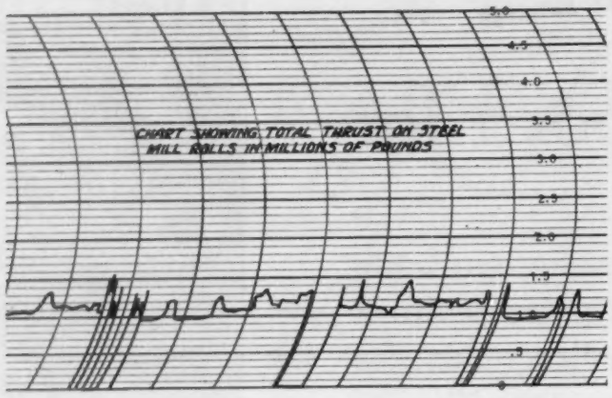
All of the above previously discussed instruments are installed permanently and are making measurement at all times. In addition to these, the electrical department of a modern steel mill is equipped with a variety of portable instruments to make spot checks, or with which more elaborate data can be obtained on special tests. Some of the recording instruments used on special tests are arranged to supply especially high chart speeds so extremely detailed records can be made during special test runs.

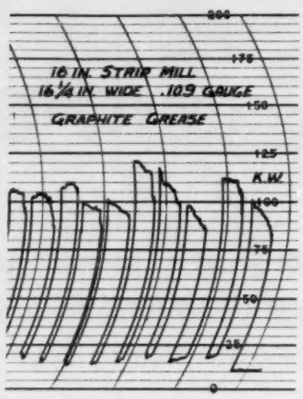
Portable instruments which have been found of value include both alternating and direct-current wattmeters, voltmeters, ammeters, as well as speed recorders, power factor recorders and frequency recorders. Even pressure recorders are used in some cases, such as on "oil gear" drives or flying shears.

Check by Electrical Department

Often it becomes the electrical department's task to determine whether or not a particular job can be handled, especially if it involves a heavier gage than previously rolled or a slightly wider stock or a special alloy which must be rolled at a particular temperature. In some of the smaller mills handling special alloy steels, often short runs will involve high power demand charges which may offset the profits expected from rolling the special order, so it is the electrical department's task to make the necessary tests which will determine such a possibility in advance.

Another instrument application which is not in the rolling mill but which is so new that it deserves mention is a system for measuring, indicating and recording oil flow to open hearth furnaces, soaking pits or other oil-fired equipment. This new device employs a positive displacement pump inserted in the fuel supply line. This pump is rotated by the flow of fluid through it and transmits its rotation to a small self-excited generator which operates remote indicating or recording voltmeters. This device is finding great favor in a number of steel plants where heavy oil is used for fuel, as it is said that no previous device has been entirely satis-





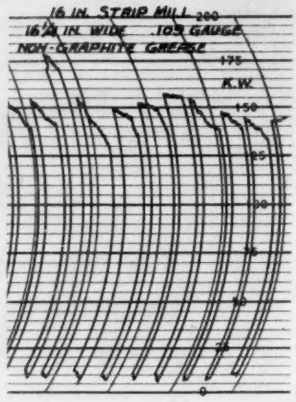


Fig. 1. (Left)—Chart shows total thrust on rolls as work passes through. Fig. 2. (Right)—Two records of same mill with same size strip but with two different greases

factory for measuring the flow of such oil, which may vary widely in specific gravity and temperature.

Fig. 1 shows a record of total thrust on steel mill rolls when a slab of steel passes through the mill. From such records much information can be obtained.

Two charts detailing energy consumption are shown in Fig. 2, both of which were made on a 16-inch strip mill. These show a load reduction of 25 per cent when the grease was changed to a graphite type. This gives a direct comparison of the value of different lubricants. Such records of power input to mill not only disclose the peak rolling power, but reveal variations in power from strip to strip as passage of each strip can be seen clearly on the chart. Also it indicates idle power between slabs. It will be noticed that the graphite grease has a slightly higher idle power consumption than the nongraphite grease. Apparently the graphite grease was heavier bodied than the grease originally used. This caused a higher idle power consumption but greatly reduced power consumption when mill was loaded.

A report from the electrical engineer of an Ohio steel mill indicates the possibilities in power saving that can be effected if sufficient information on the load is available. At this plant a graphic record was made of the total power load of the mill. Immediately it was apparent that the peak load for the week occurred when the plant started on Monday morning. Since the mill purchased its power, this Monday morning peak fixed the demand charge for the entire month.

A study of the causes of this excessive load at the beginning of each week's run disclosed that the highest peak usually came at about 2 a.m. each Monday, the load dropping off slightly toward 7 a.m. and then suddenly rising at that hour to about where it had been at 2 a.m. After 7 a.m. the load gradually declined throughout the remainder of the day. Then, with the exception of a few occasional peaks, the load remained fairly uniform during the rest of the week. It was apparent that about 15 minutes out of each Monday was determining the month's demand.

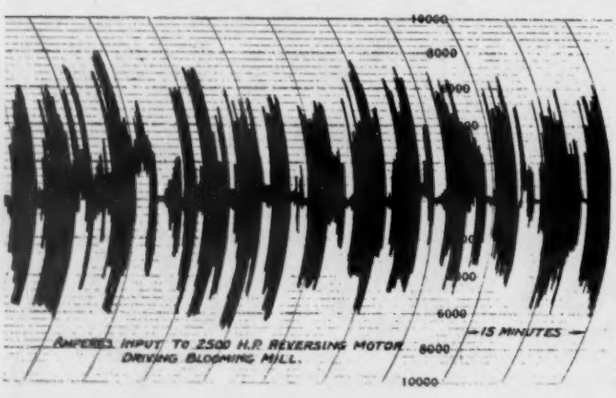
It was the practice to shut down the hot mill for changing rolls on Saturday morning with operations being started again midnight, Sunday. Of course, the roll train and driving equipment cooled off in that time and pulled hard when started. In this particular mill, one hour had been allowed for warming up, it being assumed that in that time any trouble in the roll train would show up before the first "turn" came on. However, the chart showed a steady rise in power input from the time when the first "turn" started till a maximum peak was reached at about 2 a. m. when all mills were working at capacity. This heavy work load added to the friction load of the roll train accounted for the 2 a. m. peak.

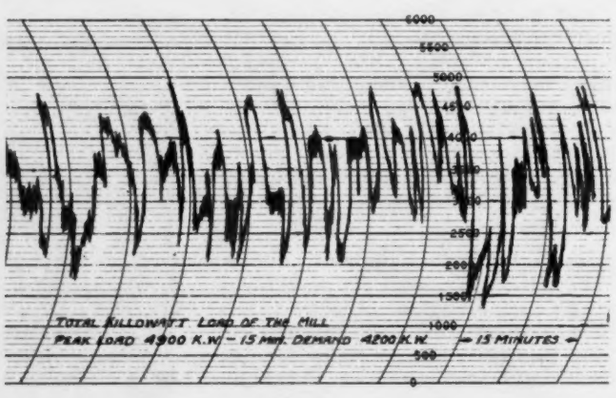
Reduced Peak Effects Savings

As the mills warmed up, the load dropped off somewhat until at 7 o'clock the cold roll mills came on. These, being cold after the Sunday shutdown, added friction and work load to that of the hot mill motors, giving another peak. A chart of drive motors input of hot mills showed that it required 4 to 6 hours operation at normal load for the friction of the roll train to reach a constant value. Then it was found that 3 hours of preliminary operation at no load was sufficient to flatten the load curve. Likewise, by allowing the cold-roll mills a warming up period of 1 hour, the peak load of their demand was reduced. This study saved this company $24,000 a year, an extremely worth while saving in any plant.

Kilowatt input records to the mills are useful in a number of other ways. Careful alignment of the roll train at each setting-up time is a big factor in reducing demand and consumption. The chart showing idle power quickly reveals poor alignment, once the minimum

Fig. 3. (Left)—Input to reversing motor driving blooming mill. Fig. 4. (Right)—Total load of this mill





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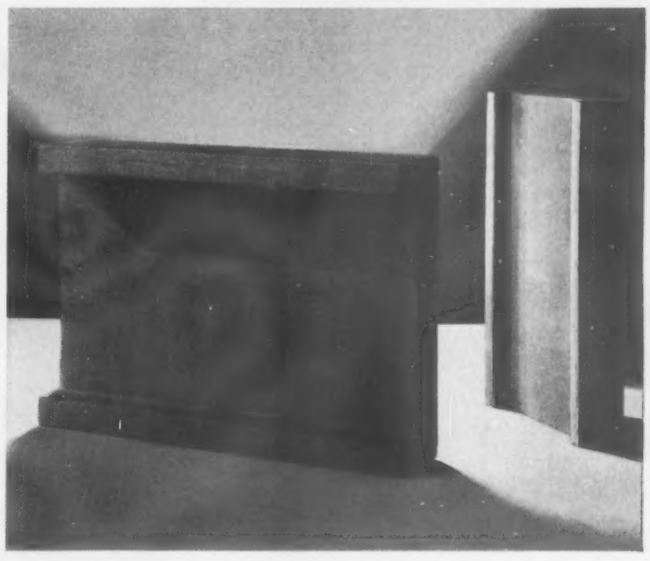

THESE savings are possible in your heat treating operations because "Carbofrax" hearths and muffles have high heat conductivity, high hot strength and remarkable resistance to abrasion.

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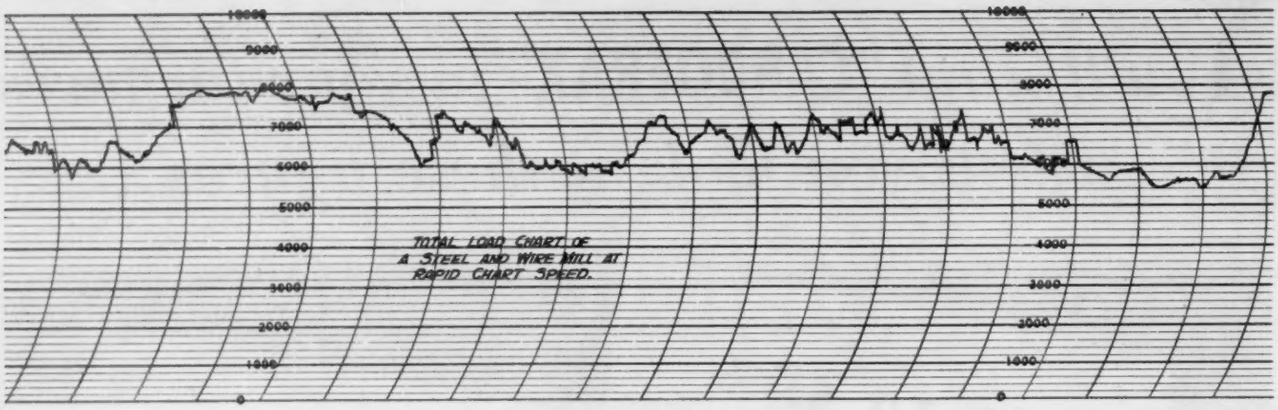


Fig. 5—A steel and wire mill produced this record of total power consumption

idle power is determined. In changing mills each week, year after year, carelessness in setting up may result with corresponding increase in power waste.

Condition of bearings also greatly affects the load. A power input record will often reveal bearing trouble. Brasses that wore badly in one plant, scarcely lasting the week out, had to be replaced by those of better quality. At this plant it was found possible to get brasses that stood up for several weeks without cutting or wearing seriously. Worn or broken brasses cause a "low" mill and spoil alignment; low housings or sunken bedplates have the same effect. These troubles all seriously increase power bills.

Worn Bearings Increase Demand

Next to hot-mill motors, cold-mill motors were the largest users of power in this plant. Mills allowed to run several weeks without changing rolls may develop worn bearings and spoil the alignment, running the power demand considerably above normal.

When certain qualities of sheets are being cold-rolled, it was the practice of the cold-roll foremen to use running water on the roll neck to cause an uneven expansion of the roll and give the desired contour. By cooling the necks below a good running heat, however, the water greatly increased the friction and caused the demand curve to mount rapidly, often doubling the normal power output as revealed by chart records.

The same roll contour was obtained by using a gas flame applied to the middle of the bottom roll, thus eliminating water and reducing the power demand to normal.

Fig. 4 shows a graphic wattmeter chart of the power load of an entire steel plant. The blooming mill, the chart of which is shown in Fig. 3, is largely responsible for the wide fluctuation of the power load, which ranges here from 1300 to 4900 kilowatts. This chart, Fig. 4, was obtained with a graphic wattmeter and was used by power company engineers to determine the capacity of substation equipment necessary when a power company contracted to take on the load of the steel mill.

Fig. 3 shows the current drawn by a 2500-horsepower blooming mill handling an ingot about every 5 minutes, and requiring currents up to 8000 amperes. Charts such as these are a great aid in laying out the necessary facilities to take care of the widely varying loads encountered.

Fig. 5 is a chart of total kilowatt load of a modern steel and wire plant. The electrical engineer of this plant regularly makes an examination of these records as they enable him to detect quickly any changes in power consumption. Average load is 8000 kilowatts in this plant and checking the record permits any unusual changes in power consumption to be spotted, grounds and other possible power losses being readily noticed on the curves.

Adds 66, Not 6 Per Cent To Heating Surface

■ Due to typographical error, head at top of p.48, July 31, STEEL, read, "Use of clay spheres in stoves gives 6 per cent increase in heating surface. . ." It should have been 66 per cent. Also both the diagram, Fig. 1, and picture, Fig. 2, referred to the Sixth Street Plant of American Rolling Mill Co., Ashland, Ky. B. B. Frost, service engineer, Arthur G. McKee & Co., should have been named as author of the article.

•

Synthetic Rubber Coat

■ Search for a synthetic rubber coating possessing the important characteristics of rubber, but immune to rubber-destroying reagents such as alkalies and oils, resulted in the development of Impervium, offered by Paramount Rubber Service Inc., Detroit. When applied as a 0.005-inch coating to a plating rack operated for one week in copper sulphate solution under severe conditions, insulation showed improvement at end of test. A container lined with it held oil at 150 to 175 degrees Fahr., for 30 days without lining being affected. Sunlight changes its color without depreciation of film. Impervium has high dielectric strength, will char but not burn. This material is not a paint and is not indestructible, as it will not withstand concentrated sulphuric acid at high temperatures and some metal salts.

Steel Highway Report

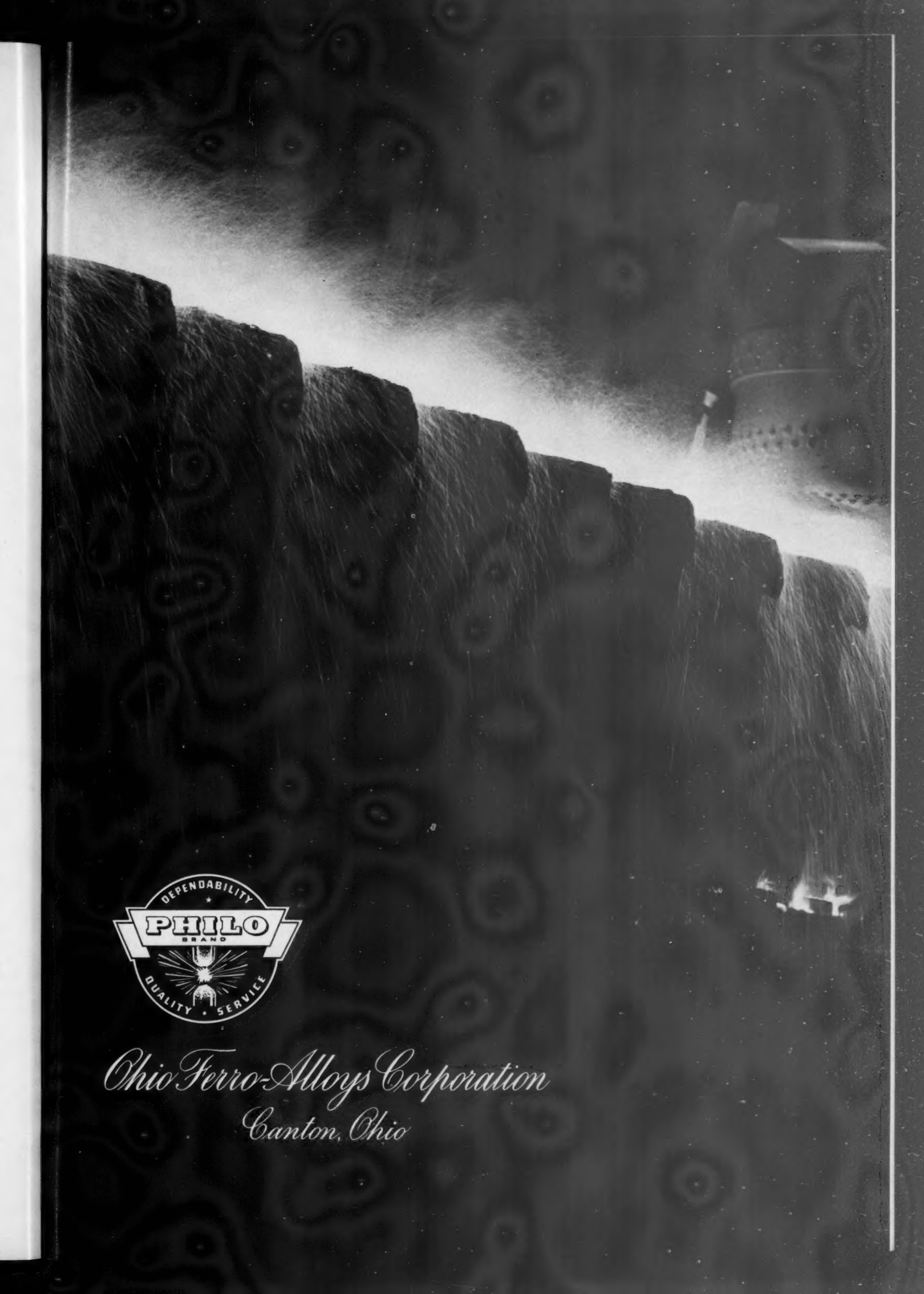
(*Concluded from Page* 50)

no disruption of the bond between plate and asphalt had been observed, and present indications are the test appears to have demonstrated such surfacing will satisfactorily adhere to steel under the test conditions. Test panel shows no signs of rutting under traffic. Some checking has taken place, but even in the checked areas there is no sign of separation between the plate and the surfacing material. Because of the solid nature of the foundation the surface checks were less noticeable than in the case of ordinary 2-inch asphalt street pavements.

Inspection report shows early surface checking can be considerably reduced, if not entirely eliminated, by the use of graded aggregates and by moist curing. Material also has a marked tendency toward self-healing in warm weather. Patching checked areas is a relatively simple matter.

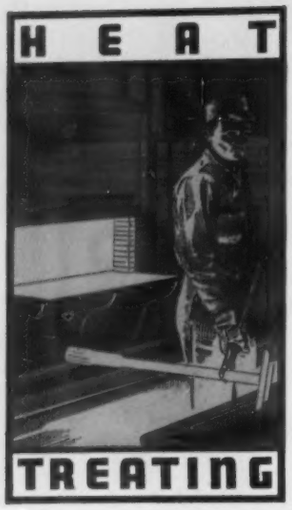
Opinions of those who have inspected the plate recently were that it was in excellent condition for the type of surface used; and, if it continues to perform as it has to date, it should provide a bridge floor surfacing as satisfactory as any bituminous roadway covering and be no more expensive to maintain.

Steel battledeck floor unquestionably provides a superior type of foundation for such a covering.



Ohio Ferro-Alloys Corporation

Canton, Ohio



Motor Dies

Heat treating department in small-motor plant handles wide variety of dies for blanking and punching laminations, stamping and forming dies, cutting tools, jigs and fixtures. Efficient layout of department facilitates production

■ MANUFACTURE of fractional horsepower motors for use in electric vacuum cleaners, fans, refrigerators, mixers, washing machines, stokers and other similar equipment made by Westinghouse Electric & Mfg. Co. is centered in its Lima, O., plant. Like the other 20 odd divisions of Westinghouse, it is a completely self-contained unit and so has its own die shop and heat treating department.

When the operations of making small motors was transferred to Lima from the Springfield, Mass., plant a little over a year ago, the die shop was one of the first units to be installed. It occupies more than 16,000 square feet of a wing on the second floor of the main building and is complete with machine tools of new and latest design.

Tool and die shop handles the making of all dies used in blanking and punching out the many intricate laminations used in the motor cores. It also produces the stamping and forming dies, cutting tools, special gages and all jigs and fixtures. The tool and die department contains the heat treating facilities for the entire factory and also houses the main tool crib. Present personnel include some 77 tool and die workers.

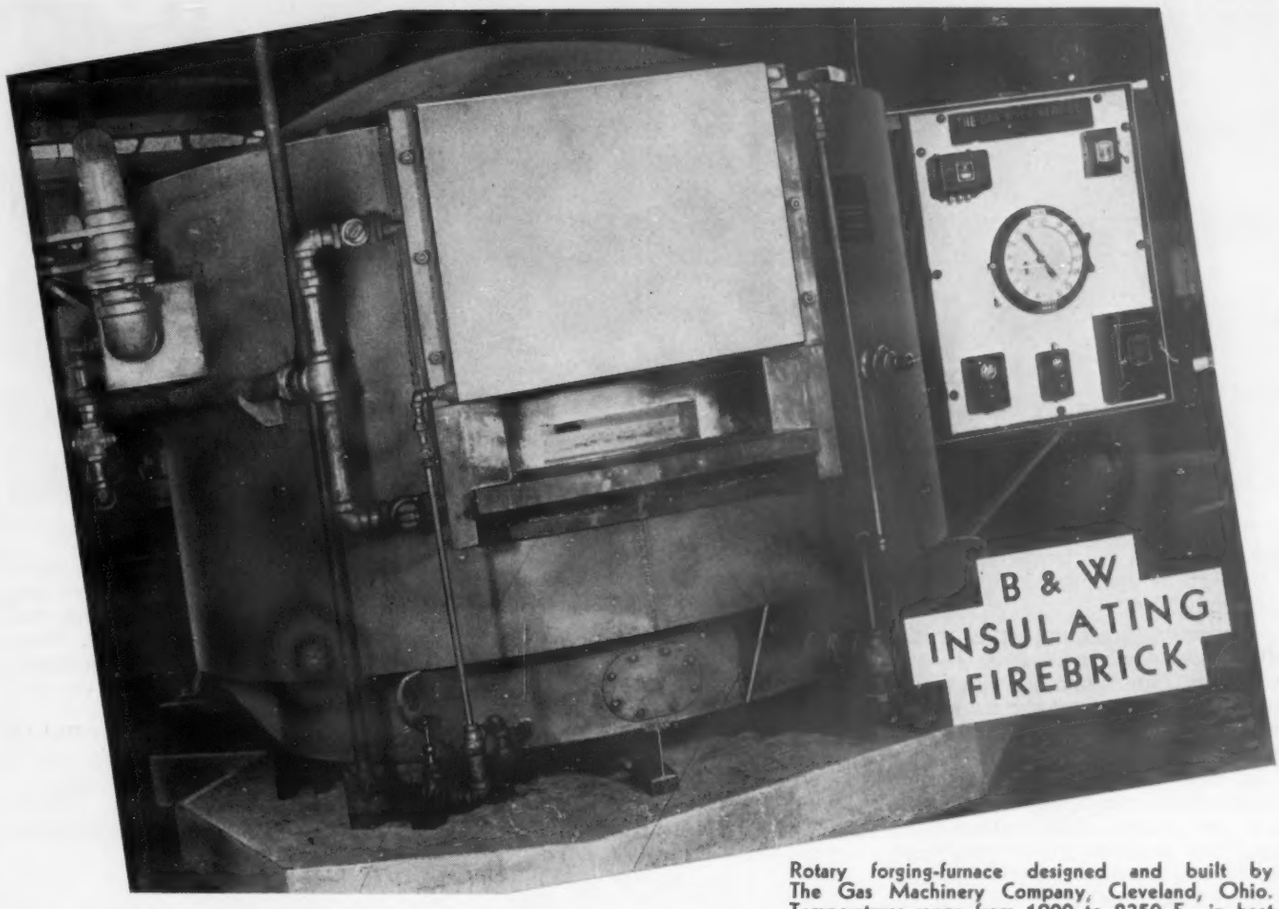
Planned Ventilation Provided

The heat treating department is in a separate area, about 25 x 45 feet in size, with brick partitions at each end and extending lengthwise the north side of the building wing. Windows along the entire north side provide an abundance of natural illumination. South side of the department is open to the building interior for maximum ventilation, wire mesh screen being used to set off the department. This arrangement permits free circulation of air during the summer thus providing comfortable working conditions at all times. In addition, covers over each furnace with individual ventilating stacks are a great aid in keeping temperature of the room to a reasonable figure in warm weather. These ventilating provisions can be seen clearly in Fig. 4.

Arrangement of furnaces and quench tanks provides maximum efficiency in handling the work as the quench tanks are located in the center of the department with the furnaces arranged around the sides of the work area and facing the quench tanks. Both gas and electrically heated furnaces are employed. Fig. 4 shows a view of the equipment along the east end of the south partition which separates the department from the other working areas on this floor. Entrance to the heat treating department is through a door in this screen, one edge of which can be seen at the extreme right in Fig. 4. Extending east from the door, Fig. 4 shows a lead pot, next to this a gas-fired furnace which works up to temperatures of 2000 degrees Fahr., and in the extreme corner a gas-fired, controlled atmosphere furnace working up to 2400 degrees Fahr. These last two are equipped with automatic recording and controlling instruments shown just to the left of the lead pot.

A small high speed unit on the east wall, also capable of operating up to 2400 degrees, adjoins the controlled atmosphere furnace. Also along the east wall are two electric

Fig. 1—Typical group of dies in the die shop with pieces they produce placed in front of each die set



Rotary forging-furnace designed and built by The Gas Machinery Company, Cleveland, Ohio. Temperatures range from 1900 to 2350 F.; in heat treating furnaces made by this company, the range is 1350 to 1600 F. B&W Insulating Firebrick are used for arches and side walls and for backing up. Largest turntable so far built has a diameter of 16 ft.

From Cold Start to 1900F. in only 20 Minutes!

Quick heat-up is one of several features of this modern forging-furnace, which is lined with lightweight B&W Insulating Firebrick. Temperature is more readily controlled, and stock shows the minimum of scale and surface decarburization. Varying types of stock are handled with machine-like precision.

These advantages are due in a large measure to the low heat-storage capacity and low heat-conductivity of B&W Insulating Firebrick.

Bulletin R-2-F gives additional facts—write for a copy.

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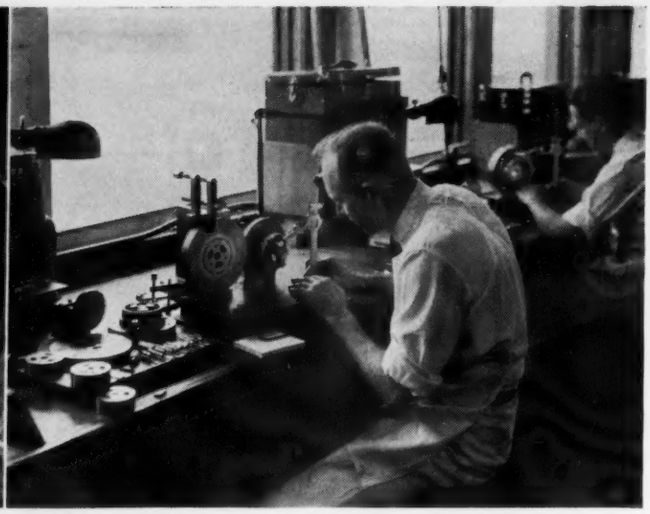


Fig. 2 (Left)—Closeup of progressive die set which will blank and punch slots in stator and rotor laminations in four successive operations. Fig. 3 (Right)—Here a die maker is checking a die set which will be used to punch slots, vents and shaft opening in rotor disks

furnaces used for tempering operations at temperatures up to 800 degrees Fahr.

Continuing around the room, along the north wall from east to west will be found a high speed electric furnace working up to 2200 degrees Fahr., a cyanide salt bath giving depths up to 0.004-inch at 1350 degrees Fahr., an Airocase unit, and an oil tempering unit operating at temperatures between 100 and 500 degrees Fahr. This completes the heating equipment except for a salt tempering bath in the southwest corner of the department. This unit operates at temperatures in the range of 700 to 850 degrees Fahr.

Tank Positions Cut Handling

Quench tanks are grouped in the middle of the department. Tanks include those for two oil baths, a hot water bath, clear water rinse, a salt brine solution and a cyanide quench bath. Being in the center of the room, they are readily accessible to the operators and so permit minimum handling time and effort.

The department handles, in general, three types of heat treating work, stamping and forming dies for manufacturing operations, tool room work such as lathe and milling tools, and heat treating of certain production parts including armature shafts, end bump washers and switch parts.

A typical group of solid dies used to make motor laminations is pictured in Fig. 1. At the left is a die set producing stator laminations for midget motors such as used in small fans and electric razors. The next die set blanks out disks. The third die set works the rotor blank formed in the second die set, punching slots for the rotor winding, holes to form ventilating ducts, and a hole for the rotor shaft. Next die set punches slots for the stator windings in the stator blank formed by die set number two.

Among the many dies handled in this department will be found a number of progressive designs similar to that shown in Fig. 2. This is a die with four working stations, two blanking operations being alternated with two punching operations. Upper section of die as seen in Fig. 2 contains a group of four individual dies. When set up in a press, the work in the form of a continuous strip will progress successively from right to left as seen in this view.

Operations at High Speed

First operation is punching out of the slots for the rotor winding and hole for the rotor shaft. In the next working position, the rotor core is blanked out and falls through the bed of the press, complete and ready to use. In the third stage, stator slots are cut for the stator windings and in the fourth step the completed stator lamination is blanked out and falls through the press bed. Thus, in four consecutive operations performed automatically at high speed, complete rotor and stator laminations are formed. These are of a type suitable for small motors such as employed in vacuum cleaners and similar equipment.

Such lamination dies are carefully packed before hardening. Then they are heated to 1960 or 1970 degrees Fahr. and quenched in oil to give a hardness around 63 to 65 Rockwell C. This treatment is fol-

(*Please turn to Page* 84)

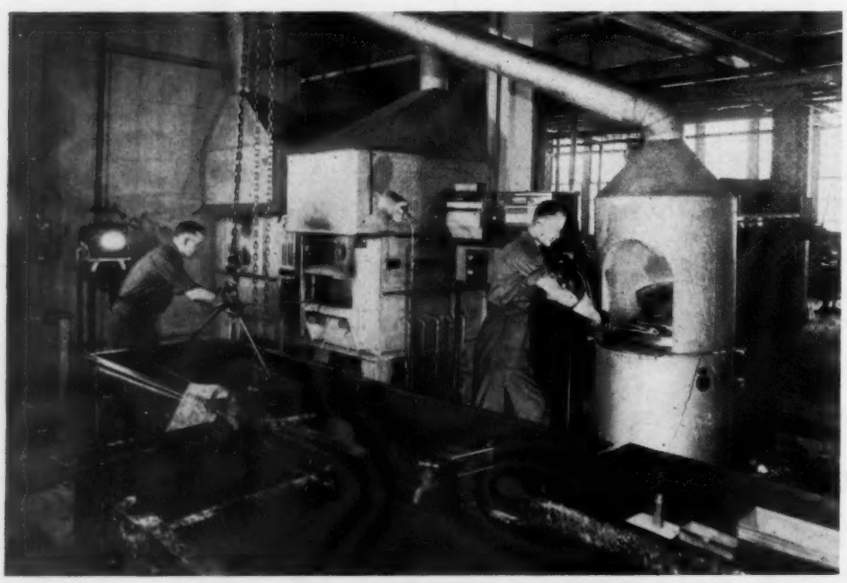


Fig. 4—View of some of the equipment in the heat treating department. Quench tanks are in immediate foreground

Advertisement

COPPER ALLOY BULLETIN

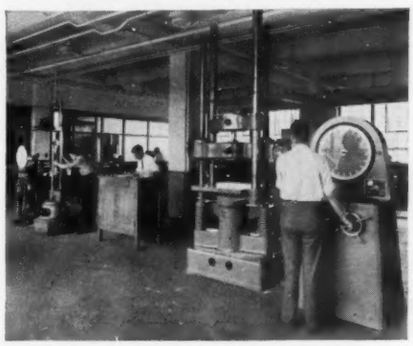
Reporting News and Technical Developments of Copper and Copper-Base Alloys

AUGUST "Bridgeport" BRASS CO. 1939

TENSILE TESTING MACHINES FURNISH MUCH BASIC DATA

Tensile testing equipment is essential in any metallurgical laboratory. Despite the development of numerous types and forms of hardness tests, the tensile test is still the standard by which the mechanical properties of metal are gauged. It is, therefore, necessary that the most accurate and up-to-date equipment be used for this essential type of work.

The tensile test is used not only as a means of checking and controlling the quality of the product, but also in the study and development of new alloys and new uses for old alloys. The testing machine is a basic form of equipment by



The most modern type of tensile testing equipment is used in the Bridgeport laboratories in studying the properties of metals.

which tests for tensile strength, elastic limits, modulus of elasticity, and bending strength may be determined. It is also possible to use the machine to determine relative forces required to perform simple deformational operations, such as drawing, expanding, forming, heading, etc. The testing machine is also adaptable for use in certain types of short-time, high-temperature tests which are helpful in indicating possible applications or methods of processing alloys.

The primary use, however, of these machines is in making a tensile test. In its simplest form, a tensile test is a test which measures the force required to fracture a piece of metal by the application of a tensile load. It is customary to record the data obtained in terms of stress per unit of cross-sectional area. In this way, samples of varying cross-sectional areas may be compared. In order to prevent the sample under test from breaking in the jaws, it is usually reduced in cross-section in the center by turning or milling. The length of

(Continued on Following Page, Column 2)

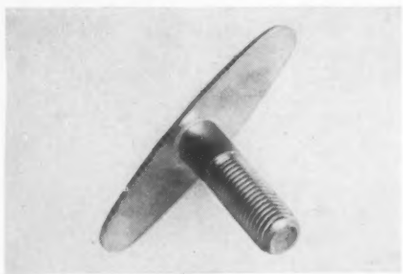
Index Now Ready

In response to requests from numerous readers of the COPPER ALLOY BULLETIN, Bridgeport Brass Company has prepared an index to all articles appearing during the year 1938. The index is completely cross-indexed to increase its usefulness, and references are included to all items appearing in the New Developments column. Copies of the index may be obtained by writing Bridgeport Brass Company.

A Difficult Heading Job

Possibilities of the heading process are shown by the tie bar bolt illustrated, which was upset from brass wire with only one intermediate annealing operation.

Bridgeport makes a specialty of supplying brass wire which is extremely ductile and is designed to take severe punishment



without internal shearing. The wire must also have a surface free from scratches or imperfections; otherwise cracks or breaks will appear on the finished article. Layout and design of tools and skilful craftsmanship are important factors in the production of articles of this type by the cold heading process, which is both economical and satisfactory.

Semi-Bright Nickel Plate

Commercial production of a soft, semi-bright nickel alloy electroplate is reported to be made possible by a recently developed process. It is said that the new semi-bright plate compares favorably in brightness with conventional bright plates, while it flows more easily under pressure on a buff. It is further stated that the deposit is extremely ductile, and will stand mechanical forming operations without flaking or peeling. Normal practice is to use a heavy deposit of the semi-bright plate.

NEW SILICON BRONZE ALLOY FOR COLD HEADED PARTS

Bridgeport Brass Company announces the addition of a new high copper silicon bronze to the Duronze* group of strong, corrosion-resisting alloys. Known as Duronze V, it was developed for the manufacture of cold headed parts with extremely large heads. For such applications, the alloy must be unusually malleable, and great care must be taken to produce wire with a surface that is free from scratches and blemishes. When metal is made to flow transversely to the direction of drawing, the surface of the wire stretches considerably and opens up, magnifying any seams or scratches that ordinarily are not even noticed.

In general, high copper silicon bronzes are more difficult to process than brass. Duronze V, however, is more ductile than brass, as is illustrated by the fact that it is generally supplied to screw and bolt manufacturers in the hard drawn condition with a tensile strength of about 90,000 lbs. per square inch. This hard material is then upset without any intermediate or relief anneals.

Duronze V, in other words, has less tendency to become overworked than brass wire, and is not subject to season or corrosion cracking. Finished bolts and screws made by the cold heading and rolled threading processes easily attain a tensile strength of over 100,000 lbs. per square inch on most sizes and are excellent for outdoor construction, such as for high tension electrical equipment, pole line hardware, marine hardware, bronze trim, outdoor signs, etc., where ordinary materials fail either from rusting or season cracking.

Duronze V can also be supplied in tube form and is being used for overhead catenary construction in the electrified railway field. Being approximately twice as strong as copper and possessing fine corrosion resistance, it is recommended for the manufacture of electrical conduit for conditions too severe for steel or copper.

Properties of Duronze V

Electrical Conductivity	9.0%
Density—Lbs. Per Cubic Inch	.313
Modulus of Elasticity	15,000,000
Coefficient of Thermal Expansion per degree F.	0.0000093

Bridgeport Brass Company will gladly discuss with fabricators the suitability of the new alloy for cold heading processes which are too difficult for other alloys.

COPPER ALLOY BULLETIN

ALLOYS OF COPPER

This is the third of a series of articles on the properties and applications of the copper alloys, and begins the subject of Gilding Metal.

GILDING METAL

The alloy generally known as Gilding Metal contains 95% of Copper and 5% Zinc. Some of the Government specifications refer to the alloy containing 90% Copper and 10% Zinc as Gilding Metal also, but the 90-10 alloy is more generally known as Commercial Bronze. The origin of the term Gilding Metal is not clear, but it seems to have been associated with the red or golden color of copper-zinc alloys which were suitable as a base for gilt paint.

Physical Properties

The physical properties of Gilding Metal are rather comparable to those of a deoxidized copper. The addition of zinc to copper increases the strength rather slowly for additions up to about 10% or 15% of zinc. The 5% zinc alloy is therefore only slightly stronger than pure copper, but because it has been deoxidized with the addition of zinc, is a very ductile, easily cold worked alloy. The alloy is also readily hot worked, which is a desirable characteristic for some purposes. It also has a thermal and electrical conductivity slightly better than half that of electrolytic copper. The alloy has a decided yellowish cast as compared to copper, but has not the golden color of the lower copper content alloys. The corrosion resistance of the alloy is also comparable to that of copper, and similarly, it has a resistance to failure by season cracking about equal to that of copper.

Probably the largest use of Gilding Metal is in small arms ammunition and primer caps. This use is apparently founded on the ability of the metal to form readily, and when formed, to be free from danger of season cracking.

Another very important application of Gilding Metal is as the basis of enameled jewelry, escutcheons, and toilet articles. Some manufacturers believe that enamel adheres to Gilding Metal better than to copper. The high temperature necessary to fuse the enamel has less softening effect on Gilding than on copper. This factor helps to explain the popularity of the alloy for inexpensive enameled jewelry.

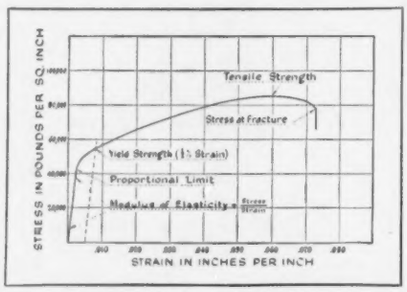
(This discussion of Gilding Metal will be continued in the next issue.)

TENSILE TESTING MACHINES

(Continued from Preceding Page, Column 1)

the parallel turned or milled section is the gauge length and is usually taken at 2", 8" or 10". Measurement of elongation or extension of the gauge length after fracture is recorded in terms of percent elongation.

If, as the test progresses, data are taken simultaneously of load and extension, it becomes possible to plot values of stress in terms of pounds per square inch against strain or elongation in inches per inch. Such a complete curve is called a stress strain curve and is shown in the accompanying figure. From this curve values for proportional limits, yield strength, and



Characteristic Stress Strain Curve.

maximum strength may be determined. The proportional limit is the stress at which the relation of stress and strain ceases to be in direct proportion. Below this stress the metal is assumed to be elastic, and within this range, the ratio between the stress and strain is called the modulus of elasticity. In most metals the actual point at which rapid yield takes place under short time loading is higher than the proportional limit. There have been many more or less arbitrarily selected methods for determination of yield strength. The present commonly accepted one is that stress at which the gauge length has been extended one-half of 1%. (See curve).

Non-Ferrous Metals in Automobiles

A survey recently made of the use of non-ferrous metals in automobiles, buses, and trucks in the United States shows that the average amount of copper used per car in this country is 64 pounds.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. Further information on any of these items may be obtained by writing the Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

A new cleaning material is reported to be suitable for use prior to chromium plating, especially after bright nickel or buffed nickel operations. It can be used either with or without current. It is claimed that laboratory tests and practical operations show satisfactory resistance to attack by chrome solutions.

A granular compound is employed with water and a new solvent to remove buffing and polishing compounds from brass parts. It is said to remove grease and insoluble dirt from the surface. Work is dipped into the solution, and can be handled on the same racks used in plating operations.

A coating material, applied like paint, is said to assist in preventing arcing and attack by acids, alkalis, dust, or salt air. It can be used on motors, controls, and the exterior surfaces of conduit.

Spatter-proofing materials have been developed for application on metal surfaces to prevent adherence of welding spatter. Two types are available. The first is transparent and is said to be suitable for arc, butt, and flash welding. The second is a white pigmented material intended primarily for resistance welding.

A new packing for condenser tubes is said to consist of flexible metallic rings, applied with tools recommended by the manufacturer. There are three basic designs: a central fibrous core about which are spiraled a number of metallic strands, each with its own fibrous core; a central core about which plain metallic strands are folded longitudinally; and a packing composed entirely of metal without the core construction, using longitudinally folded strands spiraled together into cable form.

A motor-generator set is said to be especially adapted for heavy-duty production plating. Both motor and generator are reported to be of high efficiency, and design gives enough capacity to handle peak loads. Generator is rated at 3,000 amperes.

Non-sparking wrenches for hazardous locations combine hand forged steels with the spark protection of copper, it is claimed. Surfaces are completely clad with copper, so that only the coated surface strikes the ground if the wrench is dropped. Body of tools is said to be strong and durable.

Saw blades are made in an angular tooth design to cut brass, copper, and other soft metals in the form of tubing, sheet, or rod. It is said that the teeth leave only a slight burr on the cut end. Blade is available in diameters from 6 to 10 inches and in thicknesses from .032 to .081 inch.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.— Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,** for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers; oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

BRASS "Bridgeport" CO.

Established 1865

COPPER WATER TUBE AND FITTINGS—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

*Trade-name.

BRIDGEPORT BRASS

Pivoted Bases

Modernization of fan drives by installation of roller bearings and pivoted motor bases permits use of smaller motors, reduces power and belt costs. Unity power factor induction motors raise plant power factor, lower energy costs

■ EXPERIENCE of the Osborn Mfg. Co., Cleveland, with pivoted motor bases indicates their application is often accompanied by a surprising saving in energy consumption as well as increased efficiency of the entire drive with better operation of the driven equipment.

This company operates a large plant in which all types of brushes are made. Also a considerable section is devoted to manufacture of foundry molding machines, core blowing machines, as well as sand treating and conveying equipment for foundry use.

One application of a pivoted motor base was on an exhaust fan drive where a 10-horsepower motor was employed to drive a centrifugal type fan mounted on the roof over one of the manufacturing sections. This motor operated at constant speed and constant load.

Motor Size Reduced

Desiring to modernize the drive to obtain increased efficiency, the bearings on the fan were changed over from sleeve type to ball bearings. A pivoted type motor base was then installed, and it was found that a 7½-horsepower motor would handle the load so the 10-horsepower motor was replaced by one rated 7½. Actual tests after this changeover was made indicate this drive is now consuming less than 5 horsepower.

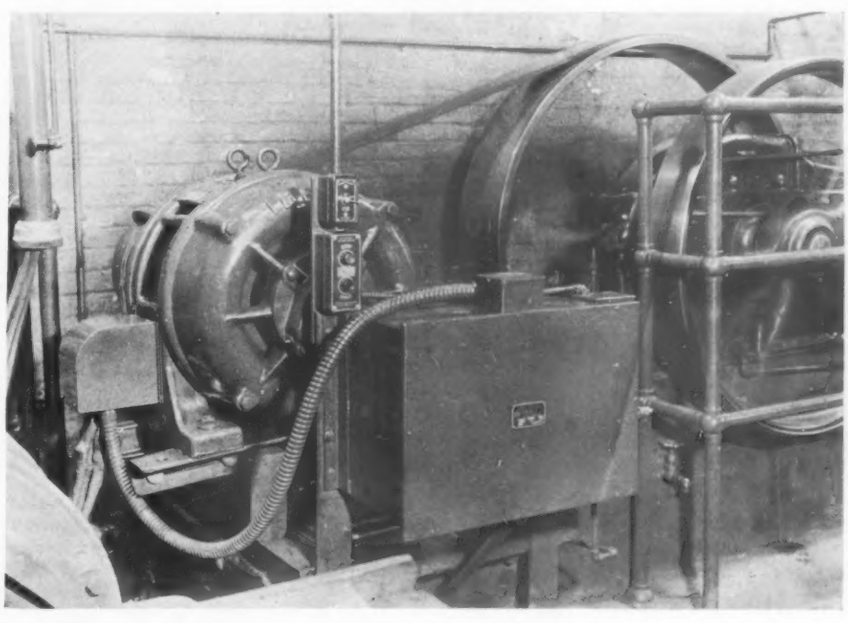
On another centrifugal fan drive, poor results were being obtained. This fan was driven by a 35-horsepower direct-current motor which was being loaded to its full rated capacity. An 8-inch belt was being used to drive the fan. When this drive was modernized and the motor mounted on a pivoted type base of the overdrive type, it was found that a 25-horsepower motor was enough.

After the changeover was completed and the drive in operation for a period of time, additional tests indicated that actual load on the motor was somewhat under 24 horsepower. At the same time, actual fan speed was increased 80 revolutions per minute, which was highly desirable. Also, it was found that the 8-inch belt could be replaced by a 6-inch belt with the new drive. This increase in efficiency was looked upon as being quite significant since it involved a saving of not only some 11 horsepower but was accompanied by an increase in fan speed and use of a smaller belt with accompanying lower belt costs over a period of time.

The accompanying illustration shows yet another application of the pivoted type motor base in this plant. This motor is a 60-horsepower, 1165 revolutions-per-minute unit driving an air compressor. The horsepower running light is 15 with 65 horsepower required when the compressor is running at full load. Compressor output is rated 550 cubic feet per minute of free air, which is compressed to 95 pounds per square inch. This motor drive is called upon to withstand the shock of the loading valve on the compressor, which acts to unload the compressor until full speed is reached, at which time it closes and full load is thrown upon the motor and drive. Even under these severe conditions, it has proved an excellent drive.

Although the motor weighs 1600 pounds and is mounted 4½ inches off-center, it still can be lifted easily by hand. This, of course, is the factor that maintains belt tension uniformly and reduces wear on the belt.

Power factor correction has re-



Pivoted motor base mounting used on drive to air compressor. Though in operation, no vibration is evident in the illustration. Motor is unity power factor induction type with capacitor unit shown here mounted in front

ceived detailed study at this plant as it was found highly desirable to obtain the maximum efficiency of current utilization with resulting minimum power bills.

Originally all the motors and electric power in this plant were direct current. However, as loads increased and alternating-current power came into wider use, a number of drives were installed with alternating-current motors on them. The machine shop and brush-making equipment in this plant employ both group and individual motor drives. The motors range in size from 1 to 5 horsepower on individual motor drives and from 5 to 60 horsepower on group drives. There may be as many as six or seven motors on one machine.

Converter for Direct Current Motors

Over 25 years ago when all the equipment installed was driven by direct-current power, all of these motors were direct-current machines. From time to time, however, additional drives were installed using alternating-current motors since these were found much cheaper to maintain, and so gradually a good share of the motor drives has been changed over to alternating-current. However, there still are a few direct-current motor drives in the plant so a converter is employed to handle this load. This machine is rated 240 volts direct current at 100 to 300 amperes.

The alternating-current services include 4160 volts at 3-phase 60 cycles entering the plant which is stepped down to 220-volt 3-phase service for motor drives and to 110-volts single phase for lighting loads. About half of the total load in the plant at the present time is lighting.

An unusual thing noticed about the plant load conditions here was that from October, 1937, to October, 1938, plant demand rose from 266 to 368 kilowatts. At first this was hard to account for because during this same period the manufacturing activities had fallen off to a considerable degree. However, investigation disclosed that although there was less total business, at the same time manufacturing operations were such that unusually high peaks were experienced, caused by demand for immediate delivery when orders were in the plant. Thus, pyramiding of rush orders in several departments at one time produced a total plant loading much higher than normal.

High Power Factor Reduces Costs

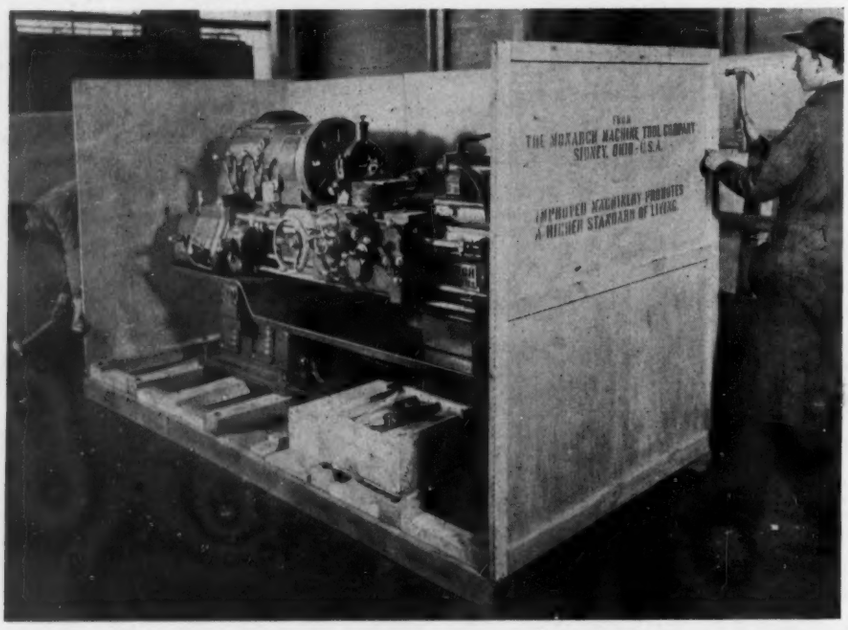
Power consumption in the plant is measured by the usual kilowatt-hour meters and also a ratcheted type reactive kilovolt-ampere hour meter is installed to aid in calculating the plant power factor. To assure most efficient utilization of plant distribution facilities and lowest losses with minimum power bills, it was desired to maintain a high plant power factor. To do this, two unity power factor induction motors are employed on drives where a high load factor exists.

One of these drives is on the air compressor shown in the accompanying illustration. This unit is driven by a 60-horsepower motor which has a power factor of 100 per cent at full load. Thus considerable power factor correction capacity is available from this motor. When lightly loaded, the power factor goes leading, which provides yet additional corrective capacity.

A second motor at 100-per cent power factor is used to drive a fan on a dust collector system as this drive also operates continuously so the corrective capacity of this motor also is available for the greater part of the working day. This 40-horsepower motor is same type as the 60-horsepower motor. Both are a special design built by Ideal Electric & Mfg. Co., Mansfield, O. They have two stator windings, the second or auxiliary winding being permanently connected to a capacitor unit which provides the reactive current necessary to balance the magnetizing current taken by the motor, thus permitting all the current taken from the power line to be used to do useful work.

These two motors maintain the plant power factor at an average value of 93 per cent with total power consumption averaging 50,000 to 60,000 kilowatt hours per month. Their installation raised the average power factor from around 80 per cent to the present value of approximately 93 per cent. Average demand in this plant is 330 kilovolt amperes.

Lathes Completely Boxed in Plywood



■ **Used instead of conventional open crating, these fully-enclosing plywood boxes protect finished surfaces of lathe from dust, cinders, etc. Open space between hardwood skids is closed with ¼-inch paperboard. Stenciled slogans make sides of box a publicity medium. Photo courtesy Monarch Machine Tool Co., Sidney, O.**

How To Sell at Retail

■ *Effective Retail Selling,* by Bernard F. Baker; fabrikoid, 287 pages, 5½ x 8¼ inches; published by American Technical Society, Chicago; supplied by STEEL, Cleveland, for $2.25; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S. W. 1.

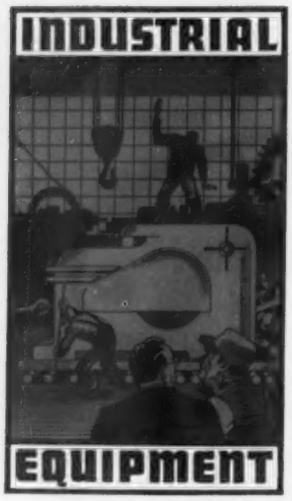
To afford better training of retail salespeople the author has compressed into this volume a large fund of information as to best means of meeting the customer with the best psychology to complete the sale.

Increasing knowledge of merchandise on the part of the consumers has brought need for better information on the part of salespeople and this book stresses this concept, making it possible for them to prepare to meet the situation through constructive effort.

The author has had the assistance of many experts in salesmanship and obtained much material from companies, government agencies and universities. It is a practical treatise of much value.

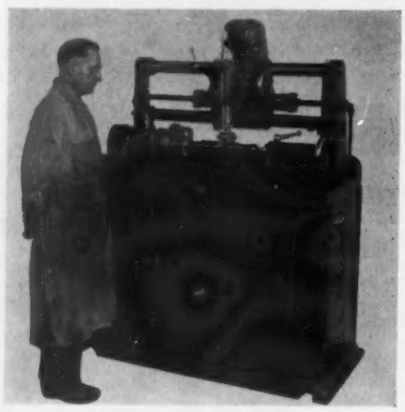
This group of Niagara Streamlined Punch Presses is one of several batteries totalling over a hundred Niagara Presses recently installed in the plants of one of the world's largest automobile manufacturers.

Because Niagara Streamlined Punch Presses are completely self-contained and require comparatively little floor space, they can be placed close together so that operators can pass the work from one to another, thereby decreasing handling costs on successive operations. When rearrangement of the production line is needed, it is a simple matter to move these machines because of their compact design and integral motor drive. Instant acting Niagara 14-Point Engagement Sleeve Clutch and anti-friction mounted gears operate in oiltight case. Niagara Machine & Tool Works, Buffalo, N. Y. Branches: New York, Cleveland, Detroit.



Superfinishing Machine

■ Foster Machine Co., Elkhart, Ind., announces a general purpose superfinishing machine for cylindrical surfaces up to 4 inches in diameter and 18 inches in length, and 6 inches in diameter on shorter lengths. Headstock may be equipped for center, collet or chucking work. Transmission is arranged for an infinite number of spindle speeds up to approximately 550 revolutions per minute. Readings as low as 2 millionths of an inch are obtainable.



Unit detects and removes surface defects, eliminates wear and gives a bearing surface said to be 5 to 10 times smoother than finish obtainable by other methods.

Precision Standards

■ George Scherr Co., Inc., 128 Lafayette street, New York, is marketing a set of precision measuring standards called Utra-Chex. Set

consists of nine standards accurate to 8 millionths of an inch and will make 71 combinations in steps of 1/16-inch up to 4 7/16-inch and 41 combinations in steps of .100-inch up to 4.1-inch. Also available with this set is Scherr optical parallel, accurate in planeness within 4 millionths of an inch, used to check parallelism of micrometer anvils by observing light interference bands on both anvils.

Circuit Breaker

■ Square D Co., 6060 Rivard street, Detroit, has designed MO Multibreakers of 15, 20 and 25 amperes for 115-230-volt alternating-current service. Single or double pole units

are available having flush or surface mounting, with or without grounded or insulated neutrals, and at prices beginning at $2.00 list. All have been approved by Underwriters' Laboratories.

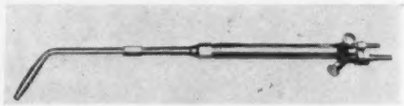
Noiseless Pillow Block

■ Ahlberg Bearing Co., 3025 West Forty-Seventh street, Chicago, offers ED-R series pillow blocks for light duty. Precision CJB bearing in this unit is completely insulated

from metal housing by molded cushion of neoprene, a synthetic rubber which is impervious to oil and grease. This construction damps noise and vibration. Neoprene seals are of floating construction, eliminating friction and giving both seals and bearings longer life. Ample provision is made for normal misalignment. Bearing is electrically grounded. Housings are solid diecastings. Shaft sizes are ½, ⅝, ¾, 15/16 and 1 inch.

Heavy-Duty Blowpipe

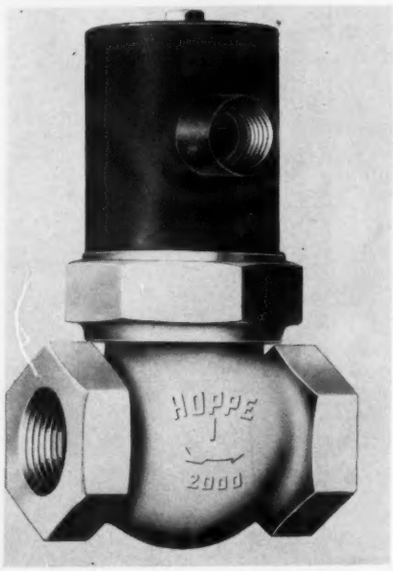
■ The Linde Air Products Co., 205 East Forty-Second street, New York, offers Oxweld (type -W26) heavy-duty welding blowpipe for welding and heating ranges above those han-



dled by ordinary blowpipes. Unit delivers heat quickly to localized area so metalworking and heat treating can be done at top speed. Extensions for welding head are available for extra-heavy work, doing away with necessity for heat shields.

Solenoid Valve

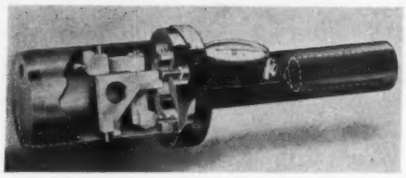
■ Hoppe Engineering Co., Indianapolis, offers type D solenoid valve in sizes ¾ to 1¼ inches for working pressures up to 2000 pounds. Units are made of steam bronze suitable for high pressure and high temperature service and may be used



for freon, methyl chloride, sulphur dioxide, brine, air, oil, water, steam and ammonia. Seats are of nickel-alloy with renewable disk. Bodies give full-way areas and offer minimum restriction to flow. Working pressures are 150 pounds steam and 400 pounds gas and liquid.

Indicator Plug Gage

■ Sheffield Gage Corp., Dayton, O., has developed indicator plug gage for checking cylindrical bores while they are still set up on finishing machine and for final inspection. Gage uses patented Reed principle and carries two gaging points diametrically opposite each other, both



freely moving in correlation with each other. Thus any irregularity on either side of the bore is instantly indicated on dial and correctly evaluated, and effects of thrust pressure between part and gage are minimized. Unit also checks a bore beyond a pilot sleeve which may be as much as ten thousandths of an inch smaller in diameter than the bore itself. No pressure pads or wear strips are required.

Dry Vacuum Pumps

■ Chicago Pneumatic Tool Co., 6 East Forty-Fourth street, New York, offers horizontal duplex dry vacuum pumps with hand-operated relief valves for starting. Simplate valves are located in cylinder heads parallel to face of piston resulting in minimum clearance volume and maximum air-handling capacity. One of discharge valve assemblies at each end of each vacuum cylinder is arranged as special automatic relief and drain. Inlet valves are located at top of cylinder and discharge valves at bottom. Passages to inlet and discharge valves are separated by water jackets which keep inlet air cool and thereby improve volumetric efficiency. Units are available for direct-connected engine type synchronous motor drive or steam drive, either compound or simple.

Protective Fan Coating

■ Autovent Fan & Blower Co., 1819 North Kostner avenue, Chicago, announces use of Heresite treatment on acid-moisture-proof and vapor-explosion-proof propeller fans for use where extremely corrosive and highly concentrated acid or gas fume conditions prevail. Fan wheels are given multiple coats baked at 375 degrees Fahr. Vapor-explosion-proof units have fan wheels of copper, brass or other nonferrous metals which also can be treated with Heresite where severe corrosive fumes are handled.

Ball-Bearing Idler

■ Chain Belt Co., 1600 West Bruce street, Milwaukee, has developed type B-304 ball-bearing idler for handling materials of medium weight consisting of fines and small lumps such as shavings, wood clips, ashes, peanuts, grain, flour, cereals, etc. Unit is suitable for conveyor widths of 14 to 30 inches inclusive. Idler rolls are made from 4-inch diameter smooth finished steel tubing with formed heads pressed into and welded to each end. Troughing idler rolls are supported in strongly ribbed brackets of unbreakable malleable iron construction. Brackets are supported on an inverted angle base which is self-cleaning with no shelves or pockets for dust accumulation.

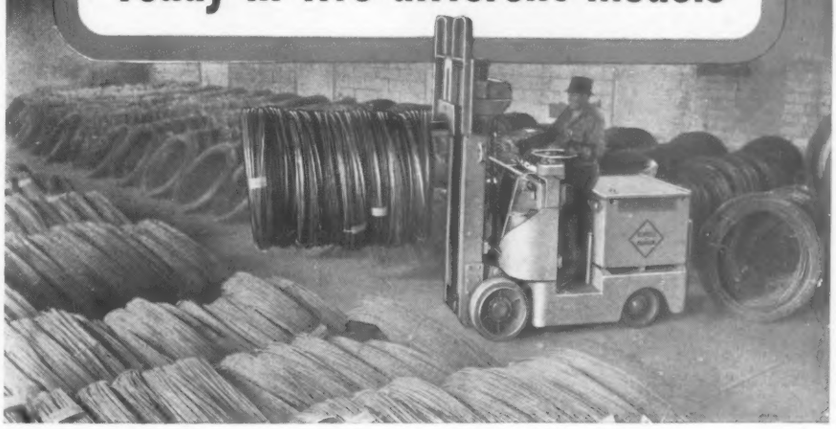
Centrifugal Pump

■ Allis-Chalmers Mfg. Co., Milwaukee, announces ball bearings as standard equipment on most of its single-stage centrifugal pumps where peripheral speeds are not excessive. A single-row deep-groove ball bearing is located on both ends of pump in cast iron adapters arranged for grease lubrication. Bearing housings accommodate either type of bearings. Lock nuts used on shaft at both ends conveniently hold bearings in place without resorting to press or shrink fits.

De-Ion Motor Starter

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed De-ion Motor Watchman manually-operated across-the-line starters for controlling grinding wheels, drill

The Elwell-Parker *NEW* Center Control Trucks are ready in five different models



and that means:—5 separate CAPACITIES ranging down from 8,000 to 2,000 pounds... 5 different WHEEL-BASE lengths and widths ... 5 different sizes of power plants—your option of power

All are equipped with the same improved Lift, Hoist and Drive Units used on other Elwell-Parker Models.

In addition, Elwell-Parker builds 5 corresponding Models of *Rear*-Control Trucks, all newly designed—thus providing *10 modern Trucks* from which you can select one or more exactly meeting your operating conditions and creating largest permanent savings for you. *Elwell-Parker goes all the way!*

Special Benefits:—Elwell-Parker New Center-Control Trucks bring the operator nearer the pay load—insure greatest visibility, greater safety—assure speedier handling and the easiest of maneuvering in close quarters. Optional attachments: Forks, Rams, Lifting-Tilting-Tiering, or others you may require.

Elwell-Parker Representatives give *first,* Engineering and Application Counsel—sales advice *afterward.* So, the Elwell-Parker Truck or System you buy is *right* for your particular use—will earn greatest profits for you.

Wire today—COLLECT. The Elwell-Parker Electric Company, 4501 St. Clair Avenue, Cleveland, Ohio.

ELWELL-PARKER *Power Industrial* TRUCKS

ESTABLISHED 1893 • BUILDING POWER INDUSTRIAL TRUCKS SINCE 1906

presses, etc. Small size is applied to motors of up to 2 horsepower; larger size is used for those up to 7½ horsepower. Positive indication of "on," "off," or "tripped position is provided by indicating toggle switch recessed within cover to prevent accidental operation. Snap-action bi-metal disk gives accurate overload protection and automatically disconnects motor from line before heat can damage windings. It is trip-free and cannot be held closed against continued overload. Safety interlock prevent accidental contact with live parts, for cover may not be opened unless switch is in "off" position. Single padlock locks switch off and door closed. Unit has nonwarping, noncarbonizing porcelain arc box and base designed especially for operation under high humidity conditions.

Hydraulic Presses

■ Colonial Broach Co., 147 Jos. Campau street, Detroit, has developed a ¼-ton press with 9-inch stroke, 1-ton press with 12-inch stroke and 1-ton press with 18-inch stroke. Streamlined in design, units are compact with floor space ranging from 12 x 20 inches for ¼-ton to 15 x 25 inches for 2-ton models and may be mounted in virtually any desired location. Pressure gage can be installed on column for use in assembly work where press-fit tolerances are important. Reading of pressure gage during assembly will indicate character of fit, thereby serving as inspection device. Hydraulic system also includes adjustable pressure relief valve so that maximum ram pressure may be adjusted to any desired amount within capacity of machine.

Center Finder

■ The L. S. Starrett Co., Athol, Mass., has center finder No. 828 consisting of a spring-tensioned pointer held in a tapered shank with pointer free to "wiggle." With center finder set in chuck or tool holder of machine and pointer guided to concentric, working point of job can be brought into alignment with machine spindle. Spring cushions pointer and protects it against damage or distortion if center finder is brought into too firm contact with the work. Pointer can be telescoped into body when not in use.

High-Speed Hole Saws

■ Black & Decker Mfg. Co., Towson, Md., has introduced high-speed hole saws for cutting round holes in any material that a hack saw will cut, and a new mandrel for ¼-inch and ⅜-inch drills that will drive hole saws up to 1½ inches in diameter.

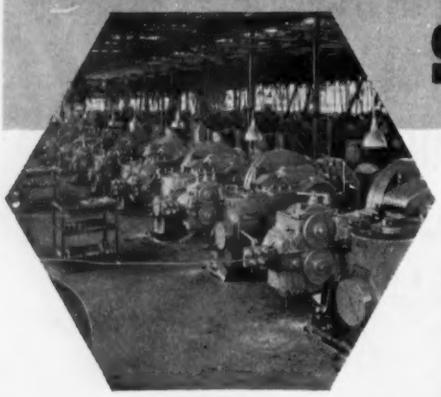
Gear Guard

■ Brown & Sharpe Mfg. Co., Providence, R. I., announces gear guard No. 0A similar to Nos. 0, 2 and 3 guards announced previously. Unit completely encloses gearing which drives headstocks of universal spiral index centers used on Brown & Sharpe No. 0 Omniversal milling machine. Made of aluminum alloy for lightness and ease of handling, guard is attached to table by two screws. Full set of change gears furnished with machine can be used, and hinge cover swings wide to allow full freedom in changing gears. Hand adjustment of headstock is made by handcrank inserted through hole in guard, which is kept closed once gears are set up.

Truck Battery

■ A description of new 3 ETF-106 type fork trucks manufactured by the Atlas Car & Mfg. Co., Cleveland, appearing on page 72 of the June 5 issue of STEEL, failed to state that the storage battery-operated units are designed so that Exide Ironclad batteries can be used as one of the sources of power. The battery compartment will accommodate 15 to 18 cells of type TLM-21, providing 30-36 volts.

ENGINEERING SKILL



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Even a century-old background of quality products is not alone sufficient to establish an unconditional reputation for engineering skill. There must also be pride in workmanship, careful inspection, modern methods and up-to-date equipment . . . all continued over years of progressive development.

R B & W products have always been noted for their accuracy and quality; for their standards of strength, finish and thread fit; for the engineering skill which these features reflect.

Such engineering skill has made EMPIRE Brand Bolts, Nuts and Rivets the indisputable standard in all industries the world over.

BOLTS: Carriage • Machine • Lag • Plow • Stove • Elevator • Step • Tap • Wheel & Rim • Battery • U-Bolts • Tire • Automotive • Drilled • Faced • Special Heat Treated • Etc. NUTS: Cold Punched • Semi-Finished • Hot Pressed • Case Hardened • Slotted • Castle • Machine Screw • Marsden Lock • Low Sulphur • RIVETS: Standard • Tinners' • Coopers' • Culvert • Clevis and Hinge Pins • SCREWS: Cap • Machine • Hanger • Sheet Metal • Phillips Recessed Head • WASHERS: Plate • Burrs • MATERIALS: Steels • Alloys • Nonferrous Metals • Brass • Bronze • Everdur • Herculoy and others • RODS: Stove • Seat • Ladder • PLATED PARTS: Cadmium • Zinc • Chromium • Nickel • Hot Galvanized • Copper • Tin • SPECIAL UPSET & PUNCHED PRODUCTS

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911

Reader Comments

(*Concluded from Page* 19)

the pit of debt with no turning point in sight on account of the condition explained in No. 2.

No, the time has not come for the "reforms" which Lippmann enumerates and which the administration is trying to perpetrate. Experiments in navigation had better be made when we are on an even keel and the weather is pleasant and then made one at a time, especially since the skipper admits that he is experimenting, is not sure of his compass and knows that while his crew are all good pals, many of them are having their first boat ride.

Yes, our execution has been bad, but not much worse than our insight—and this is not said of the present administration alone. Go back for a moment to Wilson. He did not take into account human nature, which after the war was exactly the same as it had been before. They who won were filled with greed, hatred and revenge. They who lost were desperate and after a few years of defeat were, if anything, more hungry for revenge than the conquerors. This was lack of insight.

World Still Is Savage

He theorized on self-determination and tried to map out a program following this ideal. He implanted in those who had been subject to the rule of the recently conquered the thought of new alliances and of self rule. He carefully avoided stepping on the toes of the allies and gave no thought to India and especially to Ireland, where the ruled were most bitter against the rulers. Developments have upset calculations. Self-determination as then established is part of today's fuel.

Lippmann speaks of our future as being world leaders and mentions Rome and England as having preceded us.

Rome led the ancient world. Her eagles penetrated into almost all the then known parts, but her eagles were always just behind the stubby Roman sword. It was not until the time of Augustus that the gates of the temple of Janus were closed and the world was at peace. This only because of the overwhelming strength of the Roman army.

Britain beat the Spaniards when Elizabeth was queen. Since then Britannia has ruled the waves with her fleet and it was her naval power that gave her colonies and made her respected the world over.

I believe a little reflection will convince anyone that with all our civilization the events of the past few decades have shown that the world is still as savage as ever. Turning the other cheek internationally results in a second hearty slap. There is but little recognition of such ethics between nations as exist between man and man. We are laughed at by Mexico. Britain is reported to be calmly considering a loan to Germany while she protests that she cannot repay us, and at the same time expects our help should she get into difficulties. It is also a good bet that she will be paid what she loans.

Do we want world leadership? Political? Financial? Commercial? If so, let us build up our army to be the strongest in the world. Let us have a navy at least as good as that of any other two nations combined. Let us not be afraid to use both army and navy.

I do not believe that is our destiny, nor that it is in accord with the American desire and spirit. Certainly it is not in line with the American tradition which too many are trying to discount today. Let us rather put our house in order. Stop the ruinous experimenting in "reforms" that make the rich poor and the poor poorer. Let the individual again be recognized as the fundamental unit and let it be understood that if he is permitted to work out his own destiny, the destiny of the state is secure, but if it is tried to have the state provide for the individual, then both are doomed.

NO NOISE—NO WEAR

Gears run silently when lubricated with NON-FLUID OIL. It inserts a tough, adhesive film between gear teeth, which is not destroyed regardless of running speed or tooth pressure.

Thus NON-FLUID OIL stops tooth wear and insures long, trouble-free service. Unaffected by changes in temperature, NON-FLUID OIL will not melt and drip off in hot locations—nor will it harden, ball-up and drop off at winter temperatures.

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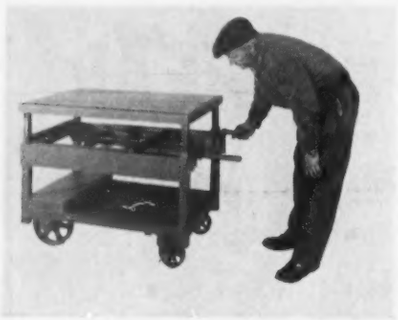
MODERN STEEL MILL LUBRICANT

Better Lubrication at Less Cost per Month

NEW METAL PRODUCTS

■ A portable lift table which serves as work bench, floor truck and lifter is offered by Service Caster & Truck Co., Albion, Mich. Table top can be raised 14 inches from lowered position, where top is 28 inches from floor. Frame is rigid at all times. Table top measuring 26 x 43 inches is 3-16-inch plate turned down 2 inches over an angle frame. Positive-cam locks engage with twist of wrist, holding table at any point of lift. Running gear is two 10 x 2½-inch nickel steel wheels, rear, and a pair of 6-inch ball-bearing forge-weld casters with swivel locks



and wheel brake, front. Table capacity is 2000 pounds, but unit can be custom-built for loads up to 5000 pounds.

■ Four electric washer models have been announced by Crosley Corp., Dayton, O., offering an invertible removable agitator made of aluminum with three high wings which can be used in two positions. Moving parts operate in lifetime lubricant, requiring no oiling. Washer is equipped with time

switch which automatically stops motor at time set. Dial indicates proper washing time for various materials.

■ McGill Mfg. Co., Valparaiso, Ind., has redesigned its Loxon and Gripon guards to follow more closely the

contour of new Mazda lamps. Guards are made of heavily tinned steel wire and are available in sizes to fit either brass shell or weatherproof sockets and for regular and mill type lamps. Loxon style is easily attached to socket and locks on with key which fits two triangular head screws protected by flush collars just large enough to admit key only. As bottom of guard is closed, use of key is necessary for removal of lamp. Gripon style is same in construction but key locking device is replaced with plain steel screws easily removed for changing lamps.

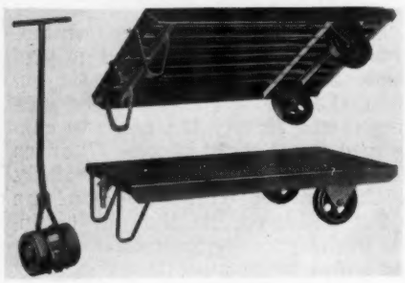
■ A 2-pound portable carbon dioxide fire extinguisher, Kidde-Lux, is announced by Walter Kidde & Co., 140 Cedar street, New York. Unit

features pistol-grip handle and trigger-control valve. Discharge horn is self-locking in any of several positions. Finger-tip control and balanced one-hand operation provide highly efficient discharge of carbon dioxide directly on fire.

■ The Util-A-Tool, a multiple tool presented by Templeton, Kenly & Co., 1020 South Central avenue, will spread or pull together structural members or any movable objects within its 10-ton capacity, as well as push, hoist, lift, lower, clamp and

brace. It removes gears, wheels, pulleys and marine propellers, according to manufacturer. Five sizes are available.

■ An all-steel electric welded truck weighing less than a conventional heavy duty wood truck has been developed by All Steel Welded Truck Corp., Rockford, Ill. Deck presents a perfectly smooth surface, sides are turned down 3 inches and minimum number of channels used on stand-



ard truck is from seven to ten, depending on size and capacity. Light gage deck does not sag under normal load. Unit can be used with Clark lift jack or as flat or factory truck.

■ Heavy duty pushbutton unit and improved design of wide flush plate mounted pushbutton have been announced by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Apparatus consists of double pole, double throw pushbutton mounted in same space as ordinary single pole, double throw unit for use in all types of heavy duty pushbutton stations. Unit has four contacts, two on each side of button, and is supplied with either standard or long button. Flush plate mounted stations have wider plate for mounting in plastered wall or machine casting. Plate sizes are 6⅜ x 4⅛ inches for single button stations; 8¼ x 6 inches for two button stations; and 10⅛ x 7⅜ inches for three button stations.

ADVERTISING PAGES REMOVED

Blast Furnace Plant

(*Concluded from Page* 60)

the bin system seemed advisable. Accordingly it was decided to remove all of the old bin systems and to replace them with McKee coke and ore bins from the old Etna furnace at Ironton, O. This bin structure could not be located in the usual manner because of impossible approach trestle conditions, thus eliminating the use of a scale car and conventional charging practice.

Charging system was arranged to continue charging the coke by means of a belt conveyor. Gas-electric dump buggies were obtained and now are used for ore charging. As the bins are set at approximately 20 degrees to the line of the skip bridge, there is ample space available to operate a number of these buggies approaching the bins from one side. This space is paved and provided with a scale near the skip chute where the burden is weighed. Accompanying illustrations show drawing of ore from bin and dumping of load into skip car.

This method of charging, while rather unorthodox, has proved highly successful at this plant. This appears to be a unique solution of a difficult problem.

This plant has now been in operation for more than 18 months and has given a splendid account of itself, not only in more economical furnace operation but also with regard to fewer delays and operating difficulties compared with previous methods.

While such a charging system may not be applicable to many other small blast furnace plants, it does indicate the possibilities which lie in out-of-the-ordinary approaches to the handling problem.

♦

Welded Aircraft

(*Concluded from Page* 56)

and the substantial character of individual members makes them generally able to take punishment.

Inspection and repair are facilitated greatly by reduced number of frame elements and screwed-on skin. An appreciable saving in weight is possible and probably will be realized with further development. Great rapidity and widespread facilities of production, using generally familiar materials and equipment will be a tremendous advantage in case of war.

In the light of research and development now in progress in new and better materials and equipment, it seems only reasonable to expect that cost can be reduced still further in the future, and applied to thinner walled structures, even to the extent that relatively small fabric covered ships can be redesigned in metal at a substantial cost saving by making use of this improved construction.

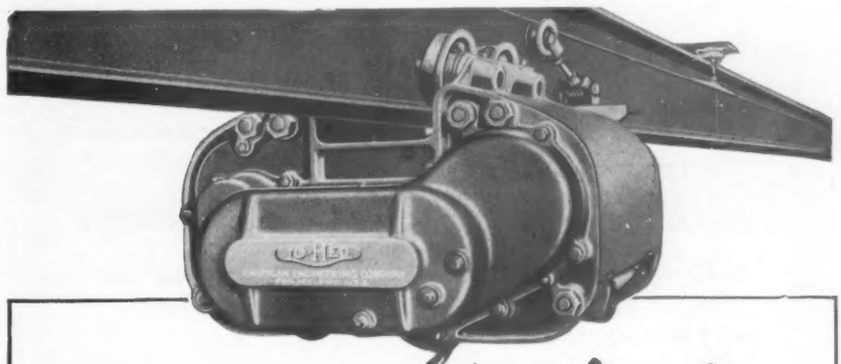
Abstracted from paper receiving third main award, $1322.82, in Aircraft classification of $200,000 Program sponsored by James F. Lincoln Arc Welding Foundation, Cleveland.

♦

Foundry Sand And Flour

■ Tam foundry zircon flour used as a core and mold wash where ordinary foundry flours and sands have a tendency to "burn in" in the castings reduces cleaning costs and produces smooth castings, according to Titanium Alloy Mfg. Co., Niagara Falls, N. Y. Mixing the flour with molasses, glutrin or core oil plus bentonite or substitutes is recommended. Melting point of flour is around 3812 degrees Fahr. Chemical analysis is 65 per cent zirconium dioxide and 35 per cent silicon dioxide.

The material also is furnished in the form of sand of the same analysis and properties as the flour but ground. This material is claimed to have given excellent service in casting stainless, heat-resistant and other alloy steels.



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PLAIN TROLLEY TYPE
A-E-CO LO-HED HOIST

The *plain trolley type* A-E-CO Lo-Hed hoist—the one you can pull along the rail—is the sensible choice under these conditions:

1. When the haul is short and the load not too heavy. 2. When the path under the hoist is walkable. 3. When the haul is long but seldom repeated. 4. When time is no great factor. For details of this and all other Lo-Hed hoists, send for our new catalog today.

A-E-CO POINTS

- Lo-Heds range from ¼ to 12 ton capacities. (Above type available from ¼ to 6 tons.
- Operates on Standard I-beams or track of any make.
- Low headroom—stacks materials higher than any other hoist.
- Safe, fool-proof.
- Compact, strong, simply constructed.
- Exceptionally low maintenance.
- Protected against dust, moisture, fumes.
- Heavy duty, ball-bearing HOIST motor.
- Automatic lowering brake.
- Ball or roller bearings at vital points.
- Improved plow-steel cable.
- 100% positive automatic stop.
- Efficient spur-gear drive . . . and

LO-HED COSTS LESS PER LIFT

OTHER A-E-CO PRODUCTS: Taylor Stokers, Marine Deck Auxiliaries, Hele-Shaw Fluid Power

A-E-CO Lo-Hed HOISTS

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

Motor Dies

(*Concluded from Page 70*)

lowed by heating in oil to a temperature of 390 degrees Fahr. for a period determined by the thickness, allowing 30 minutes for each ½-inch of metal at the thickest part. The purpose of this is not to decrease hardness so much as it is to relieve hardening and quenching strains.

While the above is typical of heat treating procedure followed in handling lamination dies, it is varied from time to time to meet the requirements of particular dies and the service to which they will be subjected. Similarly, procedure with forming dies also varies somewhat, although the following may be regarded as typical.

Forming dies are ordinarily made from No. 3 tool steel. Such dies are first preheated to 200 degrees Cent. Then they are heated to a maximum between 775 and 800 degrees Cent. and quenched in water. This is followed by heating to between 75 and 80 degrees Cent. and air cooling to relieve stresses from quenching. Afterwards, the dies are tempered by heating to the range from 175 to 200 degrees Cent., giving a hardness value between 60 and 65 Rockwell C.

Many dies, after being ground to exact dimensions, are packed in and covered with borax which helps to prevent oxidation and surface distortion in heat treating.

Practically all tool room equipment to be heat treated consists of high speed steel or high chromium, high carbon material. This includes such items as lathe tools, forming tools, mill and milling tools. These are usually hardened to a value between 60 and 65 Rockwell C. In addition to tool and die work, some production work is handled in the heat treating department also.

A typical item consists of motor armature shafts. These receive a treatment in which they first are heated to a temperature around 860 degrees Cent., then oil quenched. This is followed by tempering in the range between 500 and 650 degrees Cent. This procedure is more to toughen the shafts than to harden them as final hardness values range from 22 to 30 Rockwell C.

End Bump Washers Made

Another production item handled in the heat treating department consists of what are called "end bump washers." These are assembled on motor shafts to prevent end play of the motor rotor. Made from rather thin sheets of straight spring steel, the number in a motor is adjusted during assembly to compensate for end play without binding. These washers are placed between a shoulder on the shaft and the bearing housing, some usually being employed at each end of the rotor to keep rotor and stator cores centered. To maintain their positioning action throughout the life of the motor, it is essential that these washers be quite hard and resistant to wear.

The heat treatment they receive consists first of heating to a temperature of about 800 degrees Cent. Then they are quenched in oil. This is followed by drawing at a temperature between 300 and 375 degrees Cent., giving a hardness value in the range, 44 to 48 Rockwell C.

Other production items heat treated include centrifugal switch parts which are cyanided to increase their ability to withstand wear. The centrifugal switch being a most important part of a small motor, these parts are given careful treatment, accurately controlled, to assure long life and unfailing operation.

■ Australia's steel and iron export trade has expanded appreciably the past year. For nine months ended March 31, 1939, such exports were valued at $5,073,000, compared with $3,622,000 in the corresponding period of 1937-38.

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OVER HEAD HANDLING EQUIPMENT

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Cleveland Cranes and Carriers carry a

Guaranteed { starting effort 15 pounds / running effort 10 pounds } per ton of total load

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MARKET IN TABLOID ★

Demand
Holding; miscellaneous users leading buyers.

Prices
Steadier; scrap composite highest since April.

Production
Unchanged at 60 per cent.

■ STEELMAKING has leveled off at 60 per cent after rising sharply for three weeks. Demand for finished products is sustained, however, and the outlook is encouraging.

One of the most favorable market developments is the prospect for a more rapid upturn shortly in automotive steel shipments, following the lull imposed by labor trouble. Since some steel already had been produced in anticipation of motor car requirements, prolongation of the tool and die workers strike had possibilities of retarding future operations.

Miscellaneous steel users still account for more than their usual share of total business. This situation may be changed the next 30 days as automotive operations expand, although at the same time a declining trend is indicated in requirements of heavy products for building and engineering construction.

Previous orders for structural shapes and concrete reinforcing bars will keep mills and fabricators fairly well engaged for a number of weeks, but inquiries and awards are slower. Temporarily offsetting the reduced activity in these products are heavier orders for pipe line and shipbuilding material. Recent line pipe bookings total 42,500 tons, while the navy has bought 21,300 tons of plates and sheets for two battleships.

July Pig Iron Production Gains Sharply Over 1938

Daily average pig iron production in July was 7.6 per cent ahead of June and 94.3 per cent larger than a year ago. Total output the first seven months of 14,877,167 gross tons was nearly 63 per cent greater than in the 1938 period. July showed a net gain of 12 in number of active blast furnaces.

Automobile assemblies are near the year's lowest level, but by the end of this month are scheduled to be headed upward. Last week saw a further drop of 12,000 units to 28,250. This output was nearly double the total a year ago. General Motors accounted for most of the decrease, retrenching from 15,030 units to 3530. Chrysler declined from 2540 to 2130, Ford increased from 16,875 to 17,500 and all others receded from 6150 to 5090.

Occasional small gains in railroad steel requirements still leave demand from that direction light. The fading of plans for federal assistance in financing equipment purchases is not expected to affect freight car and locomotive buying materially, but indicated gains in traffic and earnings the remainder of the year are counted on to stimulate equipment building.

Steel prices retain the stronger tone that gradually has replaced weakness of earlier months. Buyers of flat-rolled products attempting to increase contracts entered in May at concessions have been unsuccessful, and shading on plates and shapes is less prevalent. Cold-finished bar producers are introducing new quantity extras, following application of higher charges on small lots of hot-rolled bars. A change in prices and base quantities for concrete reinforcing bars also is planned.

Mills Push Shipments Of Low-Price Sheets, Strip

Sheet and strip producers are attempting to clear books of cut-price tonnage as soon as possible, by Sept. 30 in the case of smaller consumers. Shipments to automotive interests and some other large users will extend through the remainder of the year.

Manufacturers of farm equipment are not looked to for any marked upturn in steel requirements before late summer or early fall. Sustained farm income is a factor in expectations for further expansion in merchant wire products demand later this quarter.

Unusually steady schedules prevailed in the various steelmaking districts last week to hold the national average unchanged at 60 per cent. This compares with 40 per cent a year ago. Gains of 7 points to 58 per cent at Buffalo and 28 points to 68 per cent in New England were offset by a 14-point decline to 70 per cent in Birmingham.

Unchanged districts included Pittsburgh at 50 per cent, Chicago at 56, eastern Pennsylvania at 41, Wheeling at 79, Cleveland at 73, Cincinnati at 31, Detroit at 64, Youngstown at 54 and St. Louis at 47½.

Scrap markets continue bullish, with the price composite up 5 cents to $14.96 on an increase in eastern Pennsylvania. The finished steel composite is unchanged at $55.60.

COMPOSITE MARKET AVERAGES

	Aug. 5	July 29	July 22	One Month Ago July, 1939	Three Months Ago May, 1939	One Year Ago Aug., 1938	Five Years Ago Aug., 1934
Iron and Steel	$35.90	$35.87	$35.86	$35.82	$35.80	$36.50	$32.24
Finished Steel	55.60	55.60	55.60	55.62	56.00	57.20	54.00
Steelworks Scrap..	14.96	14.91	14.87	14.72	14.05	14.44	9.98

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Aug. 5, 1939	July, 1939	May, 1939	Aug., 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.20c	2.25c
Steel bars, Chicago	2.15	2.15	2.20	2.25
Steel bars, Philadelphia	2.47	2.47	2.52	2.57
Iron bars, Terre Haute, Ind.	2.05	2.05	2.10	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes Philadelphia	2.215	2.22½	2.21½	2.21½
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.00	2.00	2.05	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.10	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.00	2.00	2.03	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.08	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.40	2.45	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	Aug. 5, 1939	July, 1939	May, 1939	Aug., 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$21.34
Basic, Valley	20.50	20.50	20.50	19.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	21.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	21.21
No. 2, foundry, Chicago	21.00	21.00	21.00	20.00
Southern No. 2, Birmingham	17.38	17.38	17.38	16.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	19.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	22.215
Malleable, Valley	21.00	21.00	21.00	20.00
Malleable, Chicago	21.00	21.00	21.00	20.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	28.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	20.17
Ferromanganese, del. Pittsburgh	85.33	85.33	85.33	97.77

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.55	$14.55	$15.20
Heavy melt. steel, No. 2, E. Pa.	14.00	13.55	13.15	13.00
Heavy melting steel, Chicago	13.75	13.55	12.75	14.00
Rails for rolling, Chicago	17.75	17.75	17.25	18.25
Railroad steel specialties, Chicago	15.50	15.50	14.75	16.75

Coke

Connellsville, furnace, ovens	$3.75	$3.75	$3.75	$3.75
Connellsville, foundry, ovens	5.00	5.00	5.00	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.10c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.19-2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(Base, 15 tons or over)

Pittsburgh	2.00c
Chicago or Gary	2.00c
Detroit, delivered	2.10c
Cleveland	2.00c

Buffalo	2.00c
Birmingham	2.00c
Gulf ports	2.35c
Pacific Coast points	2.60c

Iron

Chicago, Terre Haute	2.05c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	1.80-2.05c
Detroit, delivered	1.90-2.15c
Gulf ports	2.20-2.40c
Pacific coast ports	2.50c
Philadelphia, del.	1.97-2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	1.75c-1.90c
Detroit, delivered	1.85c-2.00c
Gulf ports	2.10-2.225c
Pacific Coast	2.35c

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.40
Cement coated nails	$2.40
(Per pound)	
Polished fence staples	2.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.74; two-point cattle, 80-rod spool	$2.58
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 3 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.70c
Detroit, delivered	2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.95c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller	67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, 11 and 12	63½ 54
Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld		67½
2, lap weld		60
2½ to 3, lap weld		63
3½ to 6, lap weld		65
7 and 8, lap weld		64
10-inch lap weld		63½
12-inch, lap weld		62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	.....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼ "O.D.	13	9.26	10.67
1½ "O.D.	13	10.23	11.79
1¾ "O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼ "O.D.	13	14.54	16.76
2¼ "O.D.	12	16.01	18.45
2½ "O.D.	12	17.54	20.21
2¾ "O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½ "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½ "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Terre Haute, del.	10.00
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$21.00-21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	18.00
Do. barge	19.00
No. 2 lump	18.00-19.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00. Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25

20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40

Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do., less-ton lots 2.30

Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00; Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do., 2% 12.50c

Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c

Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Struc-tural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.88	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.61	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.40	4.60	4.50	3.51	4.09	8.59	7.19
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	4.55	4.28	3.51	4.06	8.56	7.16
Baltimore	3.70	3.85	3.80	3.55	3.55	5.00	3.55	4.90	5.05	....	4.05	....	....
Norfolk, Va.	3.90	4.00	....	3.75	3.75	5.20	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.50	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.55	4.62	3.20	3.75	8.15	6.75
Detroit	3.33	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.59	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	....	4.57	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.25	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	4.50	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.38	....	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.80	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.54	4.64	4.64	4.41	4.41	6.01	4.32	....	5.39	....	4.79	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	....	4.43	....	....
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60	5.00	5.10	....	....
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25	....	....	....	....
Seattle	3.90	4.10	5.45	3.85	3.95	5.75	3.80	6.50	5.00	....	5.60	....	....
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75	....	5.85	....	....
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.00	4.45	6.00	10.40	9.55
San Francisco	3.50	3.90	6.00	3.45	3.45	5.05	3.45	6.40	5.15	....	6.55	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	3.85	7.31	5.86	5.61	7.71
Baltimore	3.85	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.38	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.78	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.65	....	7.80	7.65	8.45
Portland, Oreg.	5.70	....	7.80	7.65	8.50
Los Angeles	4.65	9.40	8.55	8.40	9.05
San Francisco	4.50	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 0-299 pounds (hoops only) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York and St. Louis; 450-3749 pounds in Boston; 500-1499 pounds in Buffalo; 1000-1999 pounds in Philadelphia; 300-4999 pounds in San Francisco and Portland; any quantity in Twin Cities.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Pittsburgh; 1-9 bundles in Baltimore, Norfolk; 1-6 bundles in Los Angeles; 300-4999 pounds in Portland, Seattle, San Francisco; 450-3749 pounds in Boston; 500-1499 pounds in Birmingham, Chicago, Cincinnati, Detroit, St. Louis; 1500 pounds and over in Chattanooga, Philadelphia; any quantity in Twin Cities.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1000 pounds and over, except 0-299 pounds in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999 pounds in San Francisco; 0-1999 in Portland.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Aug. 3

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$17.89	2 2 0
Basic bessemer	....	19.59	2 6 0
Hematite, Phos. .03-.05	23.57 5 5 0*	.....	.....
Billets	$34.52 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.24 11 7 6	43.67	5 2 6
Standard rails	$44.46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.81c to 1.90c	4 15 0 to 5 0 0
Structural shapes	2.09c 10 0 0	1.76c to 1.81c	4 12 6 to 4 15 0
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.85c	7 10 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.52c	9 5 0
Bands and strips	2.77c 13 5 0	1.90c	5 0 0
Plain wire, base	4.08c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	....	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17	4 19 0(a)	$18.00	679.30	$16.15	475	$25.28	63
Basic bess. pig iron	21.65	4 12 6(a)	.....	....	.....	...	27.89 (b)	69.50
Furnace coke	5.38	1 4 2	5.96	225	6.87	202	7.62	19
Billets	34.52	7 7 6	27.27	1,029	29.24	860	38.73	96.50
Standard rails	1.99c	9 10 0	1.69c	1,405	2.06c	1,375	2.38c	132
Merchant bars	2.42c	11 12 0††	1.56c	1,304	1.65c	1,100	1.98c	110
Structural shapes	2.17c	10 8 0††	1.52c	1,268	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.29c	10 19 3††	1.98c	1,650	2.06c	1,375	2.29c	127
Sheets, black	3.08c	14 15 0§	2.35c	1,958‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	3.30c	2,750	4.05c	2,700	6.66c	370
Plain wire	4.08c	19 10 0	2.26c	1,880	2.48c	1,650	3.11c	173
Bands and strips	2.58c	12 7 0††	1.73c	1,444	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†12.00
Bos. dock No. 1 exp.	13.75-14.00
New Eng. del. No. 1	14.00
Buffalo, No. 1	14.50-15.00
Buffalo, No. 2	12.50-13.00
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.50-13.00
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	14.50-15.00
Cleveland, No. 2	13.50-14.00
Detroit, No. 1	11.00-11.50
Detroit, No. 2	10.00-10.50
Eastern Pa., No. 1	16.00
Eastern Pa., No. 2	14.00-14.25
Federal, Ill.	11.00-11.50
Granite City, R. R.	11.75-12.25
Granite City, No. 2	10.75-11.25
Los Angeles, No. 1	12.50-13.00
Los Angeles, No. 2	11.50-12.00
L. A., No. 1 f.a.s.	14.50-15.00
L. A., No. 2 f.a.s.	13.00-13.50
N. Y. dock No. 1 exp.	12.50
Pitts., No. 1 (R. R.)	16.50-17.00
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.00-14.50
St. Louis, R. R.	11.75-12.25
St. Louis, No. 2	10.75-11.25
San Francisco, No. 1	13.00-13.50
Seattle, No. 1	11.00-12.00
Toronto, dirs. No. 1	9.25- 9.75
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Buffalo	12.50-13.00
Chicago, factory	12.50-13.00
Chicago, dealers	11.00-11.50
Cincinnati, dealers	11.00-12.00
Cleveland	14.00-14.50
Detroit	12.50-13.00
E. Pa., new mat.	15.50-16.00
E. Pa., old mat.	12.00-12.50
Los Angeles	11.00-11.50
Pittsburgh	15.50-16.00
St. Louis	9.00- 9.50
Valleys	15.00-15.50

BUNDLED SHEETS

Buffalo, No. 1	12.75-13.25
Buffalo, No. 2	11.25-11.75
Cleveland	9.50-10.00
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	7.00- 7.50
Toronto, dealers	8.00- 8.50

SHEET CLIPPINGS, LOOSE

Chicago	8.00- 8.50
Cincinnati, dealers	7.00- 7.50
Detroit	9.00- 9.50
†Los Angeles	3.75- 4.00
St. Louis	6.00- 6.50
Toronto, dealers	4.25- 4.75

BUSHELING

Buffalo, No. 1	12.50-13.00
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	2.25- 2.75
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	11.25-11.75
Valleys, new, No. 1	14.25-14.75
Toronto, dealers	3.75- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.25- 6.75
Chicago	7.00- 7.50
Cincinnati, dealers	4.50- 5.00
Cleveland, no alloy	7.50- 8.00
Detroit	6.00- 6.50
Eastern Pa.	9.00
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	4.50- 5.00
Toronto, dealers	4.25- 4.75
Valleys	9.50-10.00

SHOVELING TURNINGS

Buffalo	8.25- 8.75
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Chicago, spcl. anal.	8.00- 8.50
Detroit	7.00- 7.50
Pitts., alloy-free	11.00-11.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	3.35
Buffalo	7.25- 7.75
Cincinnati, dealers	3.25- 3.75
Cleveland	8.25- 8.75
Eastern Pa.	6.50- 7.00
Detroit	6.00- 6.50
New York	†2.50- 3.00
Pittsburgh	8.50- 9.00
Toronto, dealers	3.50- 4.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.50-14.00
St. Louis	9.00- 9.50
Toronto	4.00- 4.25

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†4.75
Buffalo	7.25- 7.75
Chicago	6.50- 7.00
Cincinnati, dealers	3.25- 3.75
Cleveland	8.25- 8.75
Detroit	6.00- 6.50
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.75- 4.25

RAILROAD SPECIALTIES

Chicago	15.25-15.75

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	13.00-13.50

SPRINGS

Buffalo	15.50-16.00
Chicago, coil	16.00-16.50
Chicago, leaf	15.00-15.50
Eastern Pa.	18.00
Pittsburgh	18.50-19.00
St. Louis	14.00-14.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	16.50-17.00
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	17.50-18.00
Detroit	17.50-18.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.50-19.00
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	15.50-16.00
Chicago	13.50-14.00
Cleveland	16.50-17.00
Pittsburgh	16.50-17.00
St. Louis	13.50-14.00
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	13.00-13.50

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	8.50- 9.00
Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	9.00- 9.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	6.25- 6.75
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.00-16.50
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	11.50-12.00

FORGE FLASHINGS

Boston district	†7.50
Buffalo	12.25-12.75
Cleveland	11.00-11.50
Detroit	10.50-11.00
Los Angeles	9.00
Pittsburgh	14.00-14.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.75-16.25

LOW PHOSPHORUS

Cleveland, crops	17.50-18.00
Eastern Pa., crops	18.00-18.50
Pitts., billet, bloom, slab crops	19.00-19.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Cleveland	15.00-15.50
Eastern Pa., crops	17.50-18.00
Pittsburgh	17.50-18.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Boston district	†14.50
Chicago, net	17.00-17.50
Eastern Pa.	20.50-21.00
St. Louis	16.50-17.00

LOCOMOTIVE TIRES

Chicago (cut)	15.50-16.00
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.75-16.00
New York	†16.00-16.50
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾".	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.50-14.00
Chicago, rolled steel	14.50-15.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.00-16.50
Eastern Pa., steel	18.00
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	18.50-19.00
St. Louis, iron	14.50-15.00
St. Louis, iron	14.00-14.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.00-14.50
Buffalo, mach.	15.50-16.00
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.50-13.00
Chicago, railroad net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	12.25-12.75
Cleveland, mach.	17.00-17.50
Detroit, cupola, net	13.00-13.50
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	13.50-14.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.50-16.00
San Francisco, del.	13.50-14.00
Seattle	12.50-13.50
St. Louis, cupola	12.50-13.00
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.00-14.50
Toronto, No. 1, mach., net	12.00-12.50

HEAVY CAST

Boston dist. break.	†10.25-10.50
New England, del.	12.50-13.00
Buffalo, break.	11.50-12.00
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	10.50-11.00
Eastern Pa.	15.50-16.00
Los Ang., auto, net.	13.50
New York, break.	†11.00-11.50
Pittsburgh, break.	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	11.50-12.00
Chicago, net	7.75-8.25
Cincinnati, dealers	6.25- 6.75
Detroit, net	7.00- 7.50
Eastern Pa.	13.00-13.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	6.50- 7.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	11.50-12.50
Buffalo	14.00-14.50
Chicago, R. R.	15.00-15.50
Cincin., agri., deal.	11.00-11.50
Cleveland, rail	15.50-16.00
Eastern Pa., R. R.	16.00-17.00
Los Angeles	17.50-18.00
Pittsburgh, rail	16.00-16.50
St. Louis, R. R.	12.50-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten, short ton unit, duty pd. nom.	18.50-19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

—The Market Week—

Sheets, Strip

Sheet & Strip Prices, Pages 86, 87

Pittsburgh — New business in sheets and strip is steady and at full prices. Releases are somewhat heavier and are expected to increase more rapidly from now on with the stepping up of automotive operations. Sheet production is around 60 per cent, with strip output at 40. Galvanized operations are up 3 points to 59 per cent.

Cleveland — Effects of the recent tieup of part of the automotive industry's tool and die department are reflected in some slowing up of releases for cold-rolled strip. Sheet deliveries to other than automotive interests are well sustained, producers attempting to move low-price tonnage as rapidly as possible. Consumption in some instances has been heavier than expected, indicating that forward coverage by some users last May will prove less extensive than originally planned.

Chicago — With heavier automotive demand expected shortly, business meanwhile is supported chiefly by a broad range of miscellaneous users. New orders are retarded by heavy commitments made previously by large consumers.

Boston — Narrow cold strip buying is spotty. Specifications are steady, but mills have relatively less low priced tonnage booked than those in the Middle West. Tool and die strike is having an adverse influence on buying and releases by the automobile trade, but household appliance producers are buying more for prompt shipment. Prices are firmer and most business brings 3.00c, Worcester. Cold strip operations are uneven, averaging 60-65 per cent. Sheet buying is light, but specifications are maintained. Most low-priced sheet tonnage taken in May is held by continuous mills. Prices are fairly steady on the limited volume of buying.

New York—Specifications are fair although still tapering. Household appliance manufacturers continue the most active consumers. Sheet sellers are attempting not only to get in specifications, but to complete deliveries by Sept. 30 on all low-price tonnage for the general trade.

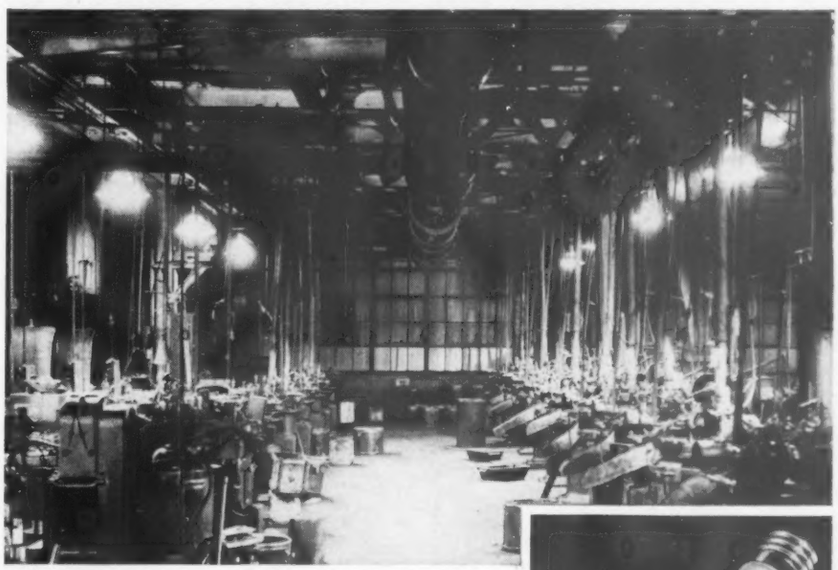
Demand for narrow cold strip specialties has improved slightly with heavier releases from the automotive industry expected soon. The latter have been lagging, and the increase in volume has been largely from miscellaneous consumers for prompt delivery and at firmer prices. Re-rolling operations have advanced a few points.

Philadelphia—Miscellaneous sheet business is coming out in surprising

believe it or not

IT'S THE SAME SHOP!

BEFORE the Aetna Ball Bearing plant in Chicago installed modern lighting, a Light Meter check-up revealed insufficient light and spotty distribution of light for easy seeing. This was caused principally by poor spacing and mounting of fixtures and the use of wrong size lamp bulbs.



AFTER the plant was light-conditioned, seeing conditions were greatly improved. Present installation includes Glassteel Diffusers spaced on 12-foot centers, each equipped with a 300 watt G-E MAZDA lamp, the kind that *stay brighter longer.*

Light Sensitive Cell

Ask your electric service company to measure your lighting with one of these G-E Light Meters.

G-E MAZDA LAMPS

GENERAL ELECTRIC

volume at the full market. Efforts to obtain an extension of low-price orders have met with refusals. A concerted move to bolster all steel prices is accompanied by efforts to eliminate over-grading on continuous mill sheets.

Cincinnati — Production is at 60 per cent, with sheet specifications averaging close to this level the past 30 days. Demand has tended upward lately, miscellaneous needs being steady and automotive interests taking heavier shipments.

St. Louis — Releases have improved materially the past three weeks, including shipments to automotive and farm implement interests. Radio and refrigerator manufacturers are operating well ahead of the rate a year ago. Sheet prices are firm on standard items.

Birmingham, Ala. — Miscellaneous sheet business is sufficient to hold production at approximately 80 per cent, demand being fairly evenly divided between manufacturers' and roofing. Strip production maintains the reduced schedule effective for weeks.

Buffalo — Sheet and strip production has reached a new peak for the year, although large automotive orders have not appeared. Bethlehem's Lackawanna mill operated a full five-day week for the first time in more than a year and established a production record for a single eight-hour shift.

SHAFER self-alignment not only permits simple and compact bearing applications, with resulting economies, but provides inherent compensation for shaft deflection, misalignment, and shock. Shafer capacity for heavy duty service is the result of the exclusive concave roller design; combining: 1. Integral self-alignment; 2. Capacity for radial, thrust, or combined radial-thrust loads; 3. Simple adjustability.

AVAILABLE IN A FULL RANGE OF SIZES: PILLOW BLOCKS · WELDED STEEL PILLOW BLOCKS · FLANGE UNITS · TAKE-UP UNITS · HANGER BOXES · CARTRIDGE UNITS · FLANGE-CARTRIDGE UNITS · DUPLEX UNITS · CONVEYOR ROLLS · RADIAL-THRUST ROLLER BEARINGS

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SHAFER *Self-Aligning* **ROLLER BEARINGS**

Plates

Plate Prices, Page 86

Pittsburgh — Placements in the plate market are considerably heavier than new projects, although several new private jobs involving over 100 tons each are up. Largest is the Water street project here taking 3300 tons. This includes an elevated highway and other work aimed at elimination of traffic bottlenecks.

Cleveland — Intake line of the Toledo, O., waterworks apparently will be concrete, a lower price being available in the larger diameter of this material than of steel. A steel line would take 8000 to 10,000 tons, depending on the diameter. Plate demand from miscellaneous users is fair, with railroad buying still slow.

New York—Award to Mason & Hanger, 500 Fifth avenue, of the general contract for Lackawack dam project of the local board of water supply is being expected momentarily. This project involves 7600 tons of steel, including 500 to 600 tons of plates, the largest plate tonnage being figured on here at present. Inquiry is up for bids Aug. 15 for 1000 tons of plates for the local and Philadelphia navy yards. Other new ship work in the East involves about 5000 tons for the naval repair ship VULCAN, construction contract for which has just been placed with the New York Shipbuilding Corp., Camden, N. J.

Three cargo vessels for Seas Shipping Co. Inc. will take 10,650 tons of steel, about two-thirds plates. Bethlehem Steel Co. is low on bids taken by the maritime commission on plans prepared by George E. Sharp, naval architect, this city, for the owners. Maritime commission has tentatively accepted low bid of Consolidated Steel Corp. Ltd., Los Angeles, for building four cargo ships at total cost of $7,560,000.

Philadelphia — Navy department has distributed orders for 21,300 tons of steel for two 45,000-ton battleships to be built at the Philadelphia and Brooklyn yards. Reported allocation follows: 8500 tons black plates, 2100 tons galvanized plates, 300 tons black sheets, 200 tons black strip to Central Iron & Steel Co.; 1300 tons galvanized

plates, 125 tons galvanized sheets, 75 tons galvanized strip to Thomas Gregory Galvanizing Works; 8500 tons black plates to Joseph T. Ryerson & Son Inc.; and 200 tons black plates to Worth Steel Co. Prices on part of the black plates were under published levels, but there were no reductions on the balance. Plate prices generally are stronger, as evidenced by withdrawal of a $2 concession offered a leading railroad last week.

Birmingham, Ala.—Demand continues active in plates with much of the tonnage going into tanks and some specialized construction.

Seattle — Fabricators report slack inquiry. Washington state has awarded to unstated interests material for 600,000 auto license plates for 1940, about 300 tons. Awards are pending for 4200 tons for drum gates at Coulee, 100 tons for a scow for Bonneville engi neers and an unstated tonnage for 96-inch outlet pipes for the Wick-iup dam, Oreg.

San Francisco — The only large plate letting of the week went to Pacific Iron & Steel Co., 125 tons for a 1,000,000-gallon tank for the metropolitan water district, Los Angeles. To date this year 19,344 tons have been booked, compared with 20,207 tons for the corresponding period in 1938. For the first time this year 1938 awards exceeded those for the current year to date.

Washington — The navy announces awards of plates, sheets and strip as follows: Jones & Laughlin Steel Corp., Pittsburgh, $51,310; Joseph T. Ryerson & Son Inc., Chicago, $377,400; Central Iron & Steel Co., Harrisburg, Pa., $488,-610.

Plate Contracts Placed

400 tons, Gary, Ind., sewers, to Taylor Forge & Pipe Works, Chicago.

130 tons, outlet pipe, bureau of reclamation, spec. 1250D, Lapine, Oreg., to John Mohr & Sons, Chicago.

125 tons, 1,000,000-gallon tank for Metropolitan water district, Los Angeles, to Pacific Iron & Steel Co., Los Angeles; previously reported to unnamed interest.

Unstated tonnage, water tank and tower, veterans' hospital, Knoxville, Tenn., to Pittsburgh-DesMoines Steel Co., Pittsburgh, $15,680.

Unstated tonnage, water tank and tower, veterans' hospital, Danville, Ill., to Chicago Bridge & Iron Co., Chicago, $19,-280.

Plate Contracts Pending

1000 tons, bureau of supplies and accounts, navy dept., schedule 6881, delivery Brooklyn and Philadelphia; bids Aug. 15.

200 tons, pipe line dredge, U. S. engineer, Washington, Dubuque Boat & Boiler Works, Dubuque, Iowa, low, $466,000.

Bars

Bar Prices, Page 86

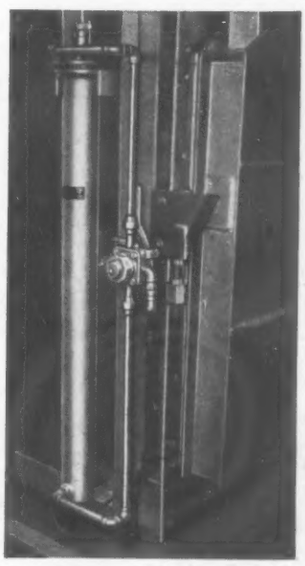
Cleveland — Carbon and alloy bar demand, recently well sustained, is expected to receive further impetus from the early upturn in automotive activity. Miscellaneous users lately have been the chief source of business. Local warehouses are strongly opposed to new quantity and cutting extras, but prior coverage will defer full application of these charges until next quarter.

Chicago — Slight improvement is noted in bar demand from automotive and miscellaneous interests. The former are counted on for further gains shortly, but farm equipment builders are thought unlikely to require materially larger tonnages until fall.

Boston—Buying has not been materially affected by revised quantity extras on hot-rolled carbon bars, demand holding steady with some spotty gains in jobber specifications. Orders for alloys and special stock are in small lots. Small tool and forging shops are buying conservatively, but a steady demand comes

Another job done better with Curtis Air Cylinders

Curtiss-Wright Corporation uses Curtis Air Cylinders at Buffalo and St. Louis Plants



Operating oven-door at Buffalo Plant

The simplicity and dependability of Curtis Air Cylinders makes them ideal for many lift, push or pull operations (as in this Curtiss-Wright installation), since interruption of production schedules to make repairs must be minimized. Under such conditions, Curtis Air Cylinders give unfailing service because of their rugged construction and simple design (only one moving part).

The installation cost of Curtis Air Cylinders or Hoists is small, and power consumption low, using regular shop air lines. Accurate control is assured, and there is no risk of injury from overload or bad atmospheric conditions. Because of their efficiency, negligible maintenance expense and long life, important savings are almost inevitable wherever they can be used.

Check your plant to see where Curtis Air Power Cylinders can be applied to increase efficiency. Our new 28-page booklet, "How Air is Being Used in Your Industry" will give you helpful suggestions. Just send in the coupon—no obligation.

CURTIS Compressors • Air & Hydraulic Cylinders Air Hoists • I-Beam Cranes & Trolleys

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1996 Kienlen Avenue, St. Louis, Missouri.
Gentlemen: Please send me the new 28-page booklet, "How Air is Being Used in Your Industry."

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City_____

from the airplane industry. Prices are generally well maintained.

New York—While sellers of plain carbon bars have put the recently announced changes in extras into effect, they will not apply to much tonnage before Oct. 1 as most consumers are protected at the old schedules. Some leading cold-drawn bar producers may announce revised schedules shortly. It is pointed out that the new carbon bar extras will impose burdens on cold-drawn bar makers, as consumers of the plain material, which they will find necessary to pass along to buyers of cold-drawn steel.

Philadelphia — Warehouses are bitter over the new schedule of quantity extras, but mills are taking a firm stand on the change, pointing out that small orders are uneconomical. Some mills have covered consumers on the old basis through August, others through third quarter. Demand is steady and fairly well diversified.

Birmingham, Ala.—Most bar business comes from highway and government construction projects. Mills report much small tonnage business, however, to hold the aggregate at approximately 65 per cent.

Buffalo — Demand from both automotive and miscellaneous sources has increased, with production at a new peak for the year. One mill working on automotive material recently went to capacity schedules.

Where you repeat the process of handling materials in production, it is frequently possible to reduce costs substantially by using a P&H Trav-Lift Crane. Designed for moderate service, these low-cost installations are saving money in many types of work. Bulletin H-13 describes them; gives complete engineering data on all sizes and types from 1 to 15 tons capacity. Ask for your copy. Harnischfeger Corporation, 4411 W. National Avenue, Milwaukee, Wis.

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Pipe

Pipe Prices, Page 87

Pittsburgh — Line pipe awards are outstanding in recent tubular business, such orders totaling 42,500 tons. Major item is 38,000 tons for lines of Standard Oil Co. of Indiana subsidiaries in the Middle and Far West. Three local interests divided 4500 tons for a New England line of Shell Union Oil Co.

Cleveland — Tubular products continue fairly active. Standard pipe demand is described as good, and business in oil well casing is steady although volume still leaves something to be desired. Following closing on several large line pipe orders a few more lines still are under consideration but have yet to develop into actual inquiries.

New York—Cast pipe buying is more active, aided by better demand from utilities. Orders are topped by 3000 tons for Panama. New York city is expected to ask bids on a large tonnage soon.

Birmingham, Ala. — Pipe plants have shown no material recession from the improved schedule effective early in second quarter. Buying is in comparatively small lots and from scattered sources.

Seattle — Largest project pending is at McChord Field, Wash., 550 tons, bids Aug. 4. Bids are in at Spokane for 183 tons of 6-inch bell and spigot. Eugene, Oreg., opened bids Aug. 7 for miscellaneous piping and system fittings.

San Francisco — Featuring the pipe market was award of 2546 tons of 6 and 8-inch pipe for Los Angeles divided among United States Pipe & Foundry Co., American Cast Iron Pipe Co. and National Cast Iron Pipe Co. Awards totaled 2659 tions and brought the year's aggregate to 21,041 tons, compared with 18,364 tons for the same period a year ago.

Steel Pipe Placed

38,000 tons, 6 and 8-inch seamless, for 440 mile oil line between Fort Laramie, Wyo., and Salt Lake City, Utah, and gasoline line between Sugar Creek, Mo., and Council Bluffs, Iowa, for Standard Oil Co. of Indiana subsidiar-

les, to National Tube Co., Pittsburgh.

4500 tons, 6-inch seamless, for Shell Union Oil Co. line in New England, divided equally among Jones & Laughlin Steel Corp., National Tube Co. and Pittsburgh Steel Co., Pittsburgh.

Cast Pipe Placed

3000 tons, Panama; 1050 tons to Lynchburg Foundry Co., Lynchburg, Va., balance to United States Pipe & Foundry Co., Burlington, N. J.

2546 tons 6 and 8-inch, Class 250, Los Angeles, as follows; 1660 tons to United States Pipe & Foundry Co., Burlington, N. J., 443 tons 8-inch to National Cast Iron Pipe Co., Birmingham, Ala. and 443 tons 8-inch to American Cast Iron Pipe Co., Birmingham, Ala.

113 tons, 6 and 8-inch, Gilbert water district, near Portland, Oreg., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

153 tons, 6-inch, Class 150, Sacramento, Calif.; bids July 11.

Rails, Cars

Track Material Prices, Page 87

Virginian railroad will open bids Aug. 15 on parts for repairs for 500 fifty-ton cars and Aug. 23 on 500 new cars of the same type as an alternate proposition.

New York Central is expected to ask bids soon on 5000 cars. Nickel Plate has awarded ten 100-ton gondolas to Pullman-Standard Car Mfg. Co., Chicago and 25 covered hoppers to American Car & Foundry Co., New York. Providence, R. I., has awarded ten trolley coaches to Pullman-Standard Car Mfg Co., Chicago.

Locomotives Pending

Chicago, Milwaukee, St. Paul & Pacific, one 600-horsepower diesel electric switch engine; bids asked.

Car Orders Placed

General American Transportation Corp., granted permission by interstate commerce commission to construct 50 fusion welded tank cars for experimental service in transportation of caustic soda.

Nickel Plate, ten 100-ton gondolas to Pullman-Standard Car Mfg. Co., Chicago; 25 covered hoppers, to American Car & Foundry Co., New York.

Car Orders Pending

New York Central, 5000 cars; bids expected to be asked soon.

Virginian, 500 cars; bids asked as alternative to repairs on same number.

Ferroalloys

Ferroalloy Prices, Page 88

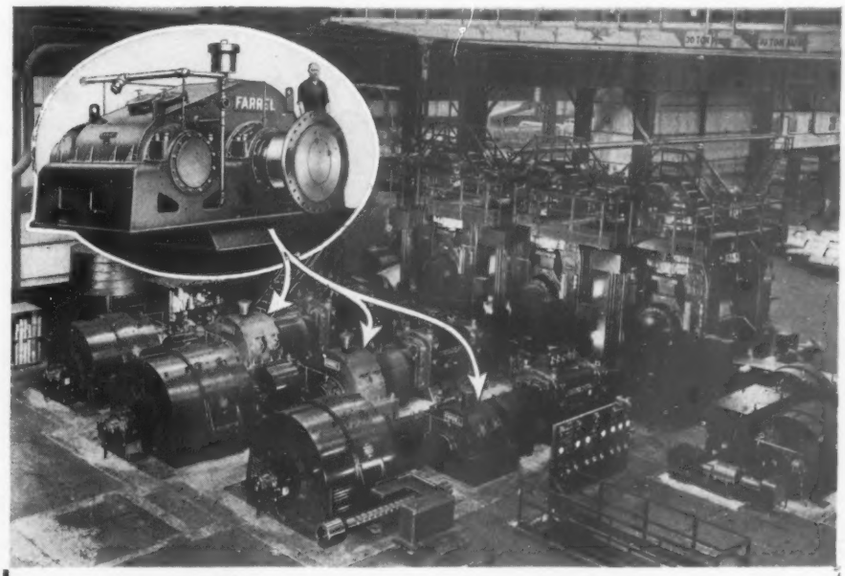
New York—Continued good movement of ferromanganese is indicated this month. Domestic prices are unchanged. In view of limited business in foreign ferromanganese, import prices are difficult to determine but appear to be within $2.50 to $3 of the domestic level. Spiegeleisen movement reflects relatively good steelmaking.

Wire

Wire Prices, Page 87

Cleveland — Business holds at a higher level than a month or two ago, with prospects favorable. Producers are confident of future improvement in merchant products demand, and better automotive operations shortly will stimulate manufacturers' wire further. New extras on wire nails, announced several weeks ago, became effective Aug. 1. Fence staples now take the same base price as nails, subject to extras.

Chicago — Demand continues to improve despite the lag in automotive specifications. Business is widely scattered, although merchant



FARREL GEAR UNITS

Drive 84" Tandem Cold Mill at New Irvin Works

In the new Irvin Works of Carnegie-Illinois Steel Corporation the 84" three-stand tandem cold reduction mill shown above is driven by three Farrel Gear Units. Two of the stands are powered by 2500 HP motors and the third by a 3500 HP motor.

These drives are typical examples of the advanced engineering and precision construction embodied in all Farrel Gear Units to assure efficient, economical, dependable performance under the most severe operating conditions.

All three drives are single reduction units with cases of all-welded steel construction which combine greater strength with less weight. Gears are continuous tooth herringbone, accurately generated by the Sykes process. Oil is supplied to gears and bearings by a central lubricating system. Built-in sprays lubricate the gears and the bearings are flood lubricated. To prevent oil contamination, dirt and moisture are trapped by breathers mounted on the covers.

Farrel Gear Units are built in any capacity for every type of service. When you have a drive problem ask to have a Farrel engineer consult with you on your requirements.

FARREL

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ANSONIA, CONN.
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products and road mesh are receiving particularly good call. The latter is near its peak for the season, although shipments will extend well into fourth quarter.

New York—Encouraging improvement in wire demand centers largely on manufacturers' material for miscellaneous uses and has appeared despite delays in automotive releases. Prices generally are steady. Spring wire business is maintained, particularly with the furniture trade. Rope volume is only fair.

Birmingham, Ala.—Bookings remain fairly active despite some slackening during late June and early July. Nails, fencing and other farm items are in consistent demand and not much restocking is in evidence.

Tin Plate

Tin Plate Prices, Page 86

Tin plate production was up 3 points to 68 per cent last week. In view of the season the upturn is regarded as only temporary. However, several export orders are pending which may help to take up the slack in the domestic market which now is entering into a normal seasonal decline. While the vegetable pack for the country as a whole is estimated at 10 to 15 per cent ahead of last year, moisture deficiency in some eastern areas has restricted tin plate releases. The fruit pack is reported not to have been affected adversely.

Shapes

Structural Shape Prices, Page 86

Chicago — Structural inquiries are lighter than a month ago and are insufficient to prevent a decline in pending work. A decline in requirement for federally-financed construction is indicated for coming months.

New York—Inquiries are headed by bridge work. These generally are small but total close to 2500 tons in New York state. Bids are expected to be asked in about two weeks on the Passaic river bridge superstructure at Kearny and Newark, N. J. A Brooklyn high school will take 2400 tons.

Philadelphia — Shape demand locally is light but other sections, notably Virginia and North Carolina, furnish considerable business. However, several round lots have been taken by fabricators in this district and about 2000 tons of bridge work will be closed within a few days.

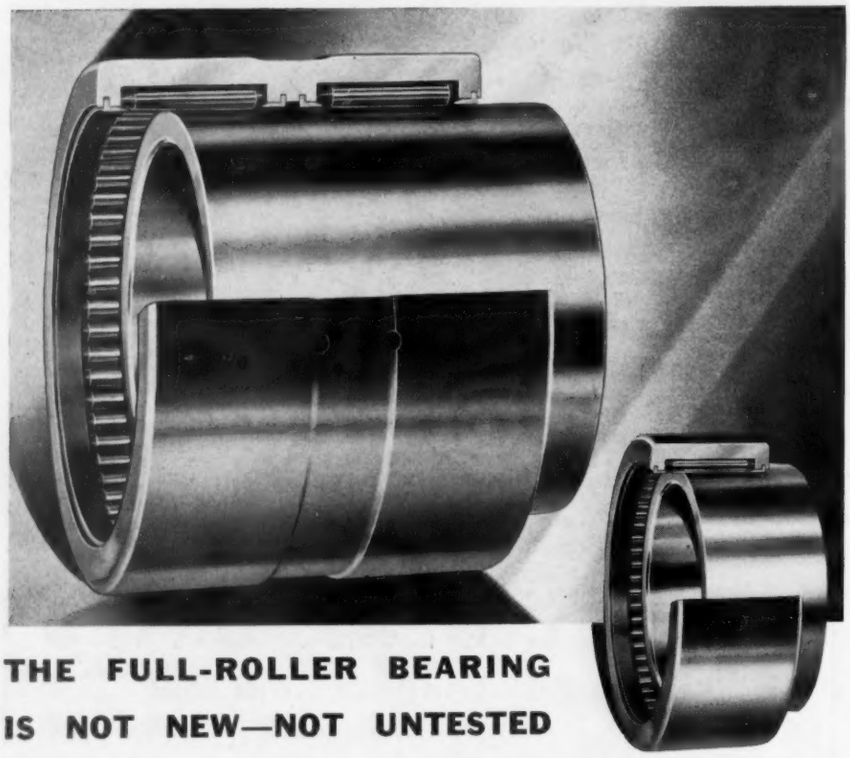
Buffalo — Inquiries are slack but fabricators and mills are busy on old orders. Awards are pending on several bridges. Most new projects are small.

Seattle—Important tonnages are lacking, bids called during the next 30 days involving lots of less than 100 tons. Whiting Corp., Harvey, Ill., is low at $167,750 for two 350-ton traveling cranes for Coulee dam, about 700 tons. Bids will be received at Coulee, Aug. 22, Spec. 868, for steel frame and trusses for a reclamation bureau garage

Shape Awards Compared

	Tons
Week ended Aug. 5	16,866
Week ended July 29	23,176
Week ended July 22	27,937
This week, 1938	28,697
Weekly average, year, 1938	21,568
Weekly average, 1939	22,406
Weekly average, June	17,590
Total to date, 1938	514,946
Total to date, 1939	694,559

Includes awards of 100 tons or more.



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IS NOT NEW—NOT UNTESTED

We've proved its value!

Other statements to the contrary, the full-roller type of bearing is not new. American Full-Roller Bearings have long proved successful. The simplicity, the precision, the additional strength of this design have been *tested and approved* in a number of severe applications. Perhaps this is the type of installation you need.

American Roller Bearing Company
Pittsburgh, Pa.
Pacific Coast Office: 321 W. Pico St., Los Angeles

AMERICAN
Heavy-Duty ROLLER BEARINGS

at Leavenworth, Wash., 90 x 143 feet, tonnages unstated.

San Francisco—Interest in the structural market centers around awards on 1700 tons for the Salt Creek bridge and 1200 tons for the O'Brien Creek bridge of the Central Valley project, Calif. Bids open Aug. 29 for the continental divide tunnel, Colorado-Big Thompson project, Colo., requiring 3425 tons of structural steel tunnel ribs. Awards totaled 894 tons and brought the aggregate to date to 72,869 tons, compared with 73,065 tons for the same period last year.

St. Louis—Interest centers chiefly in extension of federal permits for two bridges over the Mississippi river. One span from East St. Louis to this city, requiring 14,000 tons of shapes and 1000 tons of reinforcing bars, had been awarded, but financial difficulties stopped operations. Plans for the other are still tentative.

Shape Contracts Placed

1325 tons, Aetna building, 151 Williams street, New York, to American Bridge Co., Pittsburgh, through George A. Fuller Co.

1200 tons, store and tire service station, Montgomery Ward & Co., Detroit, to Whitehead & Kales Co., Detroit.

1100 tons, bridges, Bedford county, Pennsylvania section 12A Pennsylvania turnpike, to Bethlehem Steel Co., Bethlehem, Pa., through Harman Holmes, Crystal Falls, Mich.

950 tons, Paedegat basin bridge, contract MS393, Brooklyn, to American Bridge Co., Pittsburgh, through P. J. Carlin Construction Co., New York.

850 tons, Manhattan plazas, Queens midtown tunnel, New York, contract 12A, to Bethlehem Steel Co., Bethlehem, Pa.

825 tons, subway, contract 6, Winnetka, Ill., to Milwaukee Bridge Co., Milwaukee.

795 tons, Raccoon creek bridge, Bridgeport, N. J., to American Bridge Co., Pittsburgh, through F. A. Canuso & Co., Philadelphia.

570 tons, bridges, Cumberland county, Pennsylvania, section 19E—20, Pennsylvania turnpike commission, to Bethlehem Steel Co., through John H. Swanger, Lancaster, Pa.

525 tons, Washburne vocational school, Chicago, to Reuter Bros., Chicago.

500 tons, synchronous condenser house, Commonwealth Edison Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

485 tons, bridge No. 5273, Cloquet, Minn., to Worden-Allen Co., Milwaukee.

480 tons, viaduct, Powell avenue, Erie, Pa., for state, to American Bridge Co., Pittsburgh.

460 tons, bridge repairs, Riverton, Va., to Virginia Bridge Co., Roanoke, Va.

360 tons, state bridges 571 and 417, Milwaukee, to C. Hennecke Co., Milwaukee.

300 tons, sheet piling, Gage avenue bridge, Los Angeles, Calif., to unnamed interest.

300 tons, three turntables, Southern Pacific Co., San Francisco, to Hansell-Elcock Co., Chicago.

285 tons, state bridge RC—4017, Hamilton county, New York, to American Bridge Co., Pittsburgh; Elis G. De Lia & Co., New Hartford, N. Y., general contractor.

265 tons, power house, Muscatine, Iowa, to Clinton Bridge Works, Clinton, Iowa.

260 tons, bridge, South Franklin street, Titusville, Pa., for Crawford county, Pennsylvania, to Lackawanna Steel Construction Corp., Buffalo.

250 tons, state highway bridge RC-4017, Sabattis, N. Y., to American Bridge Co., Pittsburgh.

250 tons, storage bins, A. E. Staley Mfg. Co., Decatur, Ill., to Mississippi Valley Structural Steel Co., Decatur.

240 tons, bridge, Southern parkway, contract SSO—39—2, Queens, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

235 tons, bridge FAGH-544F, Asheboro, N. C., to Carolina Steel & Iron Co., Greensboro, N. C.

220 tons, St. Thomas church, Bloomfield, N. J., to Selbach-Meyer Co., Union City, N. J.

220 tons, bridge 1001-EB1, Franklin, Va., to Virginia Bridge Co., Roanoke.

215 tons, building addition, 1220 Broadway, New York to Dreier Iron Works, New York, through Jacob Schlefsinger Inc., New York.

210 tons, reconstruction of bridge SG-113, Queens, N. Y., for state, to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, pattern storage and pattern shop, Gardner-Denver Co., Quincy, Ill., to unstated fabricator.

200 tons, warehouses, Richmond, Va., to

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Richmond Structural Steel Co., Richmond.

200 tons, 3-span plate girder bridge, Vassalboro, Me., to American Bridge Co., Pittsburgh; Wyman & Simpson Inc., Augusta, Me., general contractor, $125,246, bids July 27, Augusta.

185 tons, additions, telephone building, Chevy Chase, Md., to Barber & Ross Co. Inc., Washington.

180 tons, bridge FAGH-26A, Hope Mills, N. C., to Carolina Steel & Iron Co., Greensboro, N. C.

175 tons, uptown post office building, Chicago, to Wendnagel & Co., Chicago.

175 tons, 100 First Avenue building, Rochester, Minn., to St. Paul Foundry Co., St. Paul, Minn.

175 tons, grade crossing, Staten Island, N. Y., to Bethlehem, Pa.

175 tons, grade elimination, Staten Island railway, Staten Island, N. Y., for state, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, factory building No. 6, National Oil Products Co., Harrison, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

140 tons, state hospital buildings, Central Islip, N. Y., to Belmont Iron Works, Eddystone, Pa.

140 tons, community high school building, Woodstock, Ill., to A. F. Anderson Iron Works, Chicago.

140 tons, factory building, Blake & Johnson Co., Waterville, Conn., to Berlin Construction Co., Berlin, Conn.

135 tons, school and garage, Coxsackie, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

130 tons, St. Charles Air Line repairs, Illinois Central railroad system, Chicago, to Vierling Steel Works, Chicago.

130 tons, building, Ridgewood Savings bank, Forest Hills, N. Y., to American Bridge Co., Pittsburgh.

120 tons, high school, Frostburg, Md., to Griffith Custer Steel Co., Johnstown, Pa.

115 tons, state bridge, contract 1823, Martinsville, Ind., to Bethlehem Steel Co., Bethlehem, Pa.

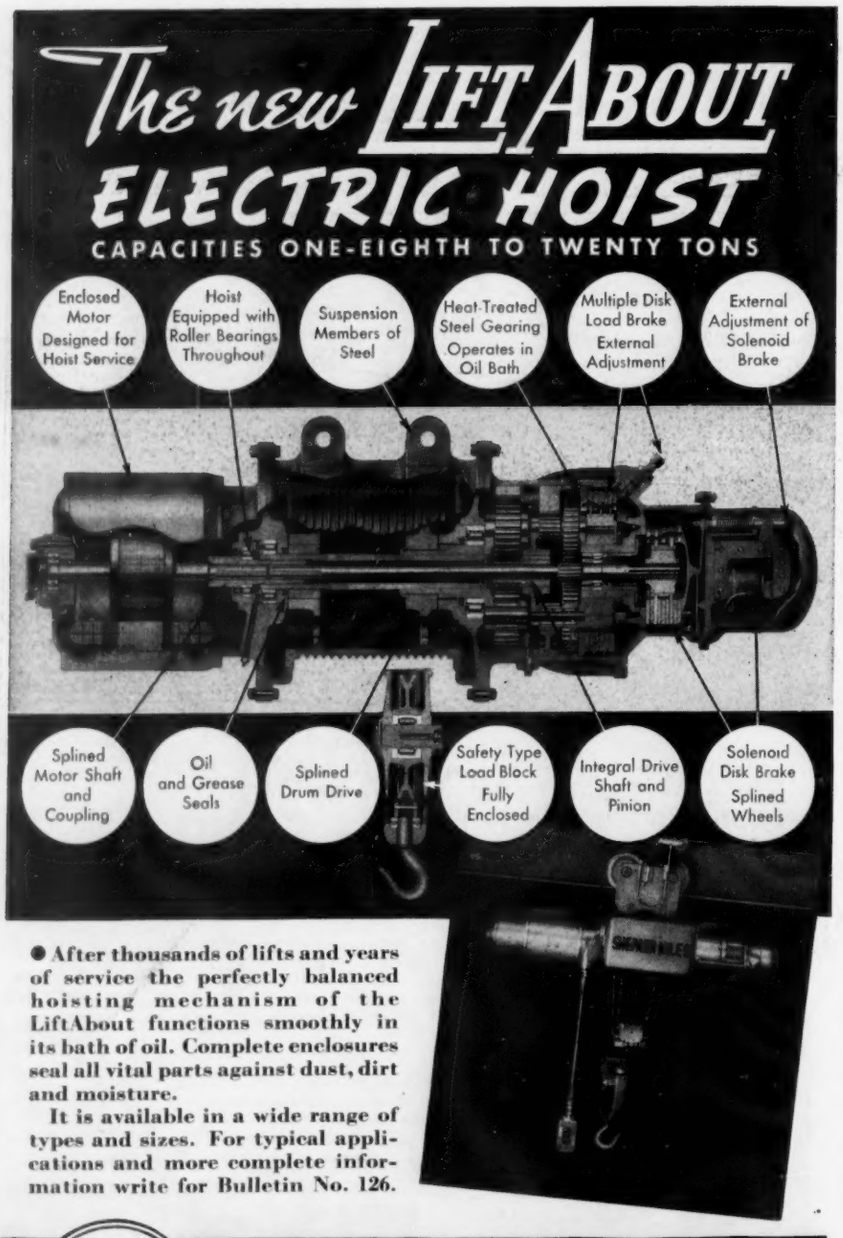
110 tons, bridge S-510-B3, Culpepper, Va., to Virginia Bridge Co., Roanoke.

110 tons, bridge for highway project RC4021, Rensselaer county, New York, to American Bridge Co., Pittsburgh, through W. W. Wyman Inc., Sherbourne Falls, Mass.

106 tons, shapes 65 tons and bars 41, grade crossing over Canadian Pacific railroad, Greenville, Me., to Bethlehem Fabricators Inc., Bethlehem, Pa., and Bancroft-Martin Rolling Mills Co., Portland, Me.; Vulcan Construction Co., Boston, general contractor.

105 tons, bridge FAGH-565, Shadwell, Va., to Virginia Bridge Co., Roanoke, Va.

100 tons, bridge for highway project RC4053, Saratoga county, New York, to American Bridge Co., Pittsburgh, through Harrison & Burrowes Inc., Jersey City, N. J.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Shape Contracts Pending

5000 tons, superstructure Passaic river, bridge, Kearney-Newark, N. J.; bids in about two weeks.

3300 tons, Water street improvement, contract 6, Pittsburgh, for Allegheny county, Pennsylvania.

2500 tons, Lackawack dam, New Ellenville, N. Y.; Mason & Hanger Construction Co., New York, low

2400 tons, Midwood high school, Brooklyn, N. Y.

900 tons, including 800 tons of piling, municipal power plant, Cleveland; bids Aug. 11.

725 tons, grade separation bridge, contract MS-39-8, New York.

700 tons, high school, Washington; bids Aug. 15.

700 tons, two 350-ton overhead traveling cranes, specification 851, Grand Coulee dam, Wash.; Whiting Corp., Harvey, Ill., low at $167,750.

625 tons, apartment, Riverdale Park Inc., New York.

615 tons, state highway bridges, Columbia and Dutchess counties, New York; bids Aug. 16, Albany.

600 tons, apartment houses, Riverdale Park Inc., New York.

600 tons, renewal of bridge over Huspahr creek, Labeco, S. C., for Seaboard Air Line railway.

430 tons, galvanized steel transmission towers, Pickwick-Memphis line; bids Aug. 16, Tennessee Valley Authority, Knoxville, Tenn.

400 tons, guides and supports, Wawarsing, N. Y., for city of New York.

375 tons, driveaway building, Lincoln factory, Ford Motor Co., Detroit.

373 tons, highway bridge, Orange, Tex.

325 tons, building No. 3, penitentiary, Lewisburg, Pa.; Belmont Iron Works, Philadelphia, low.

200 tons, addition to Ogden avenue Y. M. C. A., Chicago; bids in.

195 tons, Grand theater and store building, for Mrs. Ingalls and Mrs. Semple,

Cincinnati.

175 tons, state bridge FAS-30-B (1), Frankstown, Colo.

150 tons, grade separation bridge MS-39-5, Brooklyn, N. Y., for city of New York.

135 tons, small bridges, including Colby College underpass, Maine Central railroad, Waterville, Me.; bids Aug. 9, state highway commission, Augusta.

130 tons, remodeling warehouse for service building 1, Atchison, Topeka & Santa Fe railroad, Chicago.

115 tons, state bridge FAGH-182-B (1), Leadville, Colo.

115 tons, store building, S. S. Kresge Co., Pittsburgh.

105 tons, unloading trestle for Kentucky dam, Tennessee Valley authority, Gilbertville, Ky.

Unstated, steel tower antenna systems in Alaska, for civil aeronautics authority; E. H. Marhoefer, Jr., Chicago, low.

Unstated, frame and trusses for reclamation bureau garage at Leavenworth, Wash.; bids to Coulee, Aug. 22; Spec. 868.

Reinforcing

Reinforcing Bar Prices, Page 87

Pittsburgh—Concrete bar awards are more numerous but inquiries are light. Prices are reported better in almost all sections. Adjustments are reported under way which will aid in maintaining market strength.

Chicago — The market is quieter, few new inquiries involving over 100 tons. Several lots are pending, however, the total being nearly 12,000 tons. Public works projects predominate, principal items being the local subway and housing units.

Boston — Efforts are being made to strengthen and stabilize the concrete reinforcing steel bar market, with some success as regards small lots, which make up the bulk of purchases. Contracts have been placed for 385 tons, Connecticut highway projects, and bids close Aug. 9 with the United States engineer, Boston, on the Franklin Falls, N. H., dam, requiring 1000 tons. Bridge needs are light, 100 tons being placed for Maine spans.

New York — Bridge and highway requirements for New York state are heavier, with awards involving close to 2000 tons. Housing projects in northern New Jersey account for nearly 1500 tons, the largest being 1050 tons at Newark. Most of the 3000 tons for the Lackawack dam will be square twisted bars. While shading continues, an effort is being made to strengthen prices.

Philadelphia — Several jobs requiring considerable reinforcing bar tonnage will be advertised by the Pennsylvania turnpike commission within the next two weeks. Only about 20 per cent of total tonnage has been placed. Other work is light, small repair jobs being most numerous.

Seattle — The week's placements involved 200 tons for a project at Tustin, Mont., for the state water conservation board, and 100 tons for paving at Juneau, Alaska. About 600 tons is pending for Washington state paving jobs. Mill backlogs

Concrete Bars Compared

	Tons
Week ended Aug. 5	**11,775**
Week ended July 29	**11,475**
Week ended July 22	**7,529**
This week, 1938	**9,416**
Weekly average, year, 1938	**6,959**
Weekly average, 1939	**9,985**
Weekly average, June	**10,667**
Total to date, 1938	**180,852**
Total to date, 1939	**309,549**

Includes awards of 100 tons or more.

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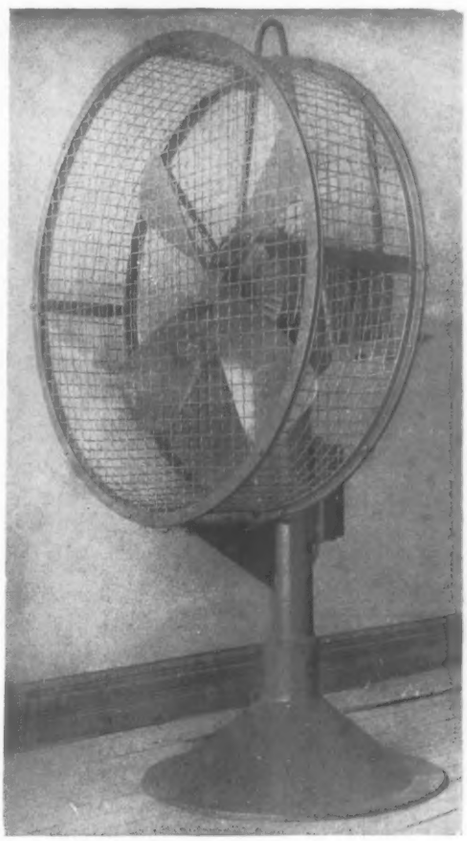

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Behind the Scenes with STEEL

Mr. Whalen, Please Note

■ American Chain & Cable has literally taken the World's Fair bull by the horns, it is reported, by encouraging the use of Metals *Products* Building as the correct monniker for the Metals building, which fronts conveniently on the area surrounding the Tripod & Periscope. They insist the exhibit is one of fabricated metal products and not raw metals and with a couple of exceptions we believe they're right. However, by the time we found the building in question, we had been shocked into the next century by the General Electric lightning maker and completely stunned by the dinner check at the Restaurant La Francaise, so we refuse to go definitely on record.

Weather Prophet

■ Incidentally, Jay O. Lashar, adv. mgr. of this same American Chain enterprise—just recently came out flat footed to predict a long, cold winter. Mr. Lashar's company makes a few auto chains and his business hobby is to probe the idiosyncrasies of the weather. He finds this summer is very similar to that of 1917, when the ocean about New York was cold and there was a protracted dry spell. The winter which followed was the severest on record, so mop that sweating brow and smile while you can—those gas bills by January will choke your grandfather's horse.

Gone Are The Days

■ We recall a few years ago that Fiorella H. LaGuardia, then and now mayor of the big city, put the bee on New York's few remaining hurdy-gurdies and drove them from the streets. Of course, news filters slowly to as far west as Cleveland but apparently local music makers have heard rumors or else been sold a bill of goods. Down on the corner now for several days has been the modern version of the old time organ grinder and his monkey. With the organ discarded for a portable radio, the monk seems completely lost and the crowd gathers mostly to listen to the afternoon baseball broadcasts. Time Marches On!

Information, Please

■ On page 61 this week Shell Oil presents (a) the after effects of a sit-down strike, (b) a new style note from *Esquire* or (c) a shiny pair of trousers. Take your choice.

Promoting Cooperation

■ With police gently socking Fisher Body strikers on the noodle last week to temper their "enthusiasm" and with trouble still very much evident in many another plant, one of management's more serious problems continues to be labor discontent and misunderstanding. Without for the moment suggesting it as a cure-all for the many angles of labor-relations, we nevertheless believe that one of the smartest jobs we've yet seen is the 40-page booklet, "YOUR WORK," published by Allis-Chalmers, a personal copy of which was distributed to every worker at the West Allis plant. Space limits any detailed description of the contents, but we strongly urge that you write for a copy, if you are interested in an idea for creating and holding the good will of your employes by giving them a complete and helpful understanding of the rules of the game.

Scrambled

■ Side by side with a large picture of the champion laying hen at the World's Poultry Congress, the *Cleveland Press* last week appropriately ran the headline: Roosevelt Signs *Hatch* Bill. That, we presume, makes him a good egg.

SHRDLU

are declining, recent awards having involved only small tonnages. Improved building construction is resulting in better inquiry for lots of less than 100 tons.

San Francisco—Awards were the largest in over two months, 4970 tons, bringing the total to date to 98,696 tons, compared with 72,002 tons for the corresponding period in 1938. Gunn, Carle & Co. booked 400 tons for silos for the Santa Cruz Portland Cement Co., Davenport, Calif., and 115 tons for power plants for the Pacific Gas & Electric Co. at Avon and Martinez, Calif. Herrick Iron Works took 256 tons for the coast guard air station, San Francisco.

Reinforcing Steel Awards

1550 tons, channel improvement and bridges, Hornell, N. Y., to Sweets Steel Co., Williamsport, Pa.; Spencer & Ross, contractors.

950 tons, Manhattan Plazas, Queens midtown tunnel, contract 12A, New York, to Bethlehem Steel Co., Bethlehem, Pa.; George J. Atwell Co., New York, general contractor.

850 tons, reservoir, army engineers, Little Rock, Ark., to Sheffield Steel Corp., Kansas City, Mo.; through Mittry Bros., Los Angeles.

750 tons, air corps barracks, Lowry Field, Colo., to unnamed interest.

532 tons, mesh, highway project RC-4027, military reservation, West Point-Cornwall, Orange county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; West Shore Concrete Co. Inc., Suffern, N. Y., general contractor, $564,805.50; bids June 21, Albany.

500 tons, female custodial group, state hospital, Camarillo, Calif., to unnamed interest.

450 tons, Northwest armory, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

440 tons, mesh, highway project RC-4015, Clinton county, New York, to Truscon Steel Co., Youngstown, O.; Louis Longhi & Son, Torrington, Conn., general contractor; also takes 85 tons of structural steel.

405 tons, power plant, drop No. 3, Imperial irrigation district, El Centro, Calif., to unnamed interest.

400 tons, silos, Santa Cruz Portland Cement Co., Davenport, Calif., for Gunn, Carle & Co., San Francisco.

400 tons, Gage avenue bridge for county of Los Angeles, California, to unnamed interest.

400 tons, outfall relief sewer, section 2, Washington, to Bethlehem Steel Co., Bethlehem, Pa., through Wagner-Larsen Construction Co., New York.

380 tons, clinker storage bins, Permante Cement Co., Los Gatos, Calif., to San Jose Steel Co., San Jose, Calif.

370 tons, mesh, highway project RC-4023, Tupper Lake-Long Lake, Hamilton county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Louis Mayersohn, Albany, general contractor, $328,905.75; bids June 21, Albany.

300 tons, Pennsylvania turnpike, section 2C, Westmoreland county, Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh; through Baldwin Bros., Cleveland.

295 tons, gun battalion barracks, Hickam Field, T. H., to Columbia Steel Co., San Francisco.

284 tons, highway mesh, Merritt parkway, Fairfield, Conn., to American Steel & Wire Co., New York; New Haven Roads Construction Co., New Haven, Conn., general contractor; bids July 24, Hartford.

275 tons, mesh, highway project RC-4018, Monroe and Ontario counties, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Warren Bros. Roads Co., Cambridge, Mass., general contractor, $294,906; bids July 7, Albany.

256 tons, coast guard air station, San Francisco, to Herrick Iron Works, Oakland, Calif.

250 tons, pump and blower house, Gary, Ind., to Concrete Steel Co., New York.

203 tons, approach piers, Passaic river bridge, route 25, section 30—B, Kearny-Newark, N. J., to Truscon Steel Co., Newark; Ole Hanson, Ventnor, N. J., general contractor, bids June 16, Trenton.

200 tons, mesh, highway project RC-4016 Wurtemburg-Weys crossing, Dutchess county, New York, to Wickwire-Spencer Steel Co., New York; John Arborio Inc., Poughkeepsie, N. Y., general contractor, $198,356.65; bids June 28, Albany.

200 tons, Mill river diversion canal, Northampton, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; through Kelleher Corp., contractors.

200 tons, state water conservation project, Tustin, Mont., to Bethlehem Steel Co., Seattle.

144 tons, mesh, highway project SSP-39-3, Southern Parkway, section 7, Suffolk county, New York, to American Steel & Wire Co., New York; Good Roads Engineering & Contracting Co. Inc., Wantagh, N. Y., general contractor, $278,391; bids June 21, Albany.

140 tons, post office and court house, Harrisonburg, Va., to West Virginia Rail Co., Huntington, W. Va.; through A. Parnell Blair, contractor.

125 tons, Shore parkway, contract SS—39—6, Brooklyn, N. Y., to Igoe Bros., Newark; Turecano Contracting Co., New York, general contractor.

115 tons, superstructures for power houses for Pacific Gas & Electric Co., Avon and Martinez, Calif., to Gunn, Carle & Co., San Francisco.

106 tons, mesh, highway project RC-2565, East Syracuse Village, Onondaga county, New York, to American Steel & Wire Co., New York; John Bellardino Inc., Seneca Falls, N. Y., general contractor, $91,157.25; bids June 28, Albany.

105 tons, floodwall Springfield, Mass; contract D, to Bethlehem Steel Co., Bethlehem, Pa.; Charles I. Hosmer, Greenfield, Mass., general contractor.

100 tons, highway project, South Windsor, Conn., to American Steel & Wire Co., New York; Lane Construction Co., Meriden, Conn., general contractor; bids July 24, Hartford.

100 tons, paving, Juneau, Alaska, to Northwest Steel Rolling Mills, Seattle.

Reinforcing Steel Pending

1300 tons, municipal power plant, Cleveland; bids Aug. 11.

1050 tons, housing project, Newark, N. J.; bids in.

1000 tons, new housing project, New Orleans; George A. Fuller Construction Co., Washington, low on general contract.

800 tons, bridge, Paerdegat Basin, New York; P. J. Carlin, low bidder.

507 tons, approach piers, route 35, section 14, Raritan river bridge, Woodbridge, N. J.; P. J. Connolly, Perth Amboy, N. J., low.

483 tons, Abraham Lincoln school, San Francisco; Meyer Construction Co., San Francisco, low on general contract.

440 tons, mesh, highway project RC-4052, Warrensburg-Chestertown, Warren county, New York; Lane Construction Corp., Meriden, Conn., general contractor, $739,303; bids July 19, Albany.

390 tons, housing project, Perth Amboy, N. J.; taking bids on general contract.

300 tons, mesh, highway project RC-4019, Madison-Onondaga counties, New York; Provo Bros. Inc., Syracuse, N. Y., general contractor, $282,638.35; bids July 26, Albany.

211 tons, auditorium, George Washington high school, San Francisco; deLucca Bros., San Francisco, low on general contract.

200 tons, six bridges in Lassen county, Calif., for state; Poulos & McEwen and M. A. Jenkins, Sacramento, Calif., low on general contract.

125 tons, dynamometer laboratory, Wright field, Dayton, O.; Simpson Construction Co., Chicago, low bidder.

115 tons, state bridges, Dutchess and Columbia counties, New York; bids Aug 16, Albany.

100 tons, addition to army hangars, Mc-

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Chord Field, Washington state; bids in July 31.

100 tons, agranomy building for University of California at Davis, Calif.; bids Aug. 9.

Pig Iron

Pig Iron Prices, Page 88

Pittsburgh — Merchant iron demand is somewhat better though still light in total. Inquiries also are more active. Prices are steady. New business is being placed at the full market, but some iron still is being shipped against old contracts.

Cleveland—Deliveries varied little the past week, but the tendency both in shipments and new business is upward. More rapid improvement in the melt awaits resumption of better automotive operations. Individual sales are slightly larger, although most foundries are covered only a short distance ahead.

Chicago — Final figures for July indicate close to a 17 per cent gain in iron shipments compared with June. First few days of August have started off at an encouraging rate, leading sellers to expect an equal gain over July may be noted this month. Foundry operations will show some improvement.

Boston—Consumers in some instances have covered through October at current prices and others have asked protection against possible price revisions. However, opinion is that prices will be unchanged next quarter. Buying is light and spotty with specifications against orders substantially ahead of new business.

New York — Specifications are slightly better but still spotty. Some contracting has appeared from consumers who had been out of the market for almost a year.

Philadelphia — Foundry melt is holding close to the June and July average. Makers of machinery and other industrial equipment are busy, with pipe foundries continuing brisk schedules. Stove plant operations are tapering slightly.

Cincinnati—Shipments have improved only a trifle lately. New business is light at firm prices. Fourth quarter prices are not under discussioin, but it is thought unlikely old contracts at less than the current market will be rewritten for that period.

Buffalo—Deliveries are 5 to 10 per cent heavier than a month ago, with production steady at 64 per cent, peak for the year to date.

St. Louis—July shipments were 10 to 15 per cent ahead of June, the improvement being fairly well distributed, except to steel foundries and the stove industry. New business is heavier, two sales of 1200 tons each being reported, although most orders are small.

Toronto, Ont. — Sales were retarded by holidays to around 700 tons for the week. Curtailment in the melt is seasonal, and a rising trend is expected by the end of this month. Prices continue steady, with no indication of early change.

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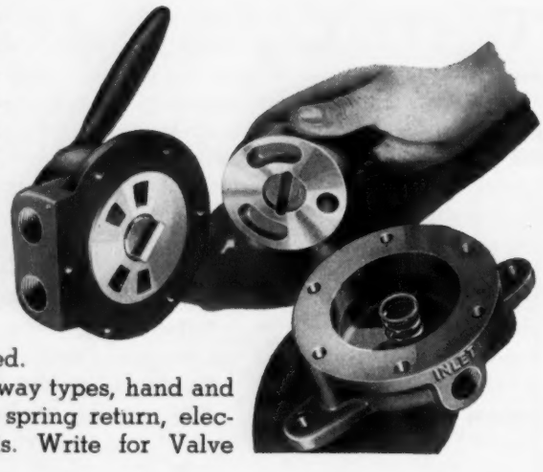

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Scrap

Scrap Prices, Page 90

Pittsburgh — Prices continue strong, although brokers are reported finding little difficulty in covering short sales, with a few exceptions. No. 1 steel holds at $15.50 to $16. Some downriver points are reported paying $16 for steel from outside districts.

Cleveland — Market is quiet with small lots moving and supplies scarce. Railroad offerings contain no large tonnages of any grade. Dealers are slow to close contracts.

Chicago — No. 1 steel continues $13.50 to $14, but brokers now are paying $13.75. Recently they were paying $14, a figure at which one mill bought additional tonnage last week. Steelworks are resisting higher prices. Quotations on several other grades are up 25 cents.

Boston — Prices tend firmer, breakable cast for shipment to eastern Pennsylvania advancing 50 cents to $10.25, f.o.b. cars. Machine shop turnings are more active for delivery to the same district, with prices slightly stronger.

New York — Reflecting heavier shipments to eastern Pennsylvania, heavy breakable cast, No. 1 machinery and old steel shafting are up 50 cents. The entire list is firm. The last purchase by Japan, involving 50,000 tons, represented an advance of 50 cents, or $15.50 dock for No. 1 steel and $14.25 for No. 2. Coverage against previous orders is at unchanged prices.

Philadelphia — The market is extremely bullish and several grades are quoted higher. No. 1 steel now is a flat $16. Some mills are reported anxious for material, but no large sales are said to be negotiated and brokers are meeting difficulty in covering old orders. No. 2 steel is higher at $14 to $14.25, brokers bidding up to the latter figure.

Buffalo — Scrap is quieter but strength still prevails in prices. No. 1 steel has been adjusted 25 cents higher at $14.50 to $15 to reflect recent sales which have been made within this range. One mill has

placed an embargo on shipments, but this is offset by the fact steelmaking is the best in almost two years.

Detroit—Prices continue strong, with a number of grades up 25 to 50 cents. As yet there has been no pronounced increase in output of automotive scrap.

Cincinnati—All prices, except on several of the lighter grades, have been advanced 25 cents. Dealers are optimistic over the outlook and are seeking to enlarge stocks. Offerings are moderate, heavier steel grades in particular being held closely.

St. Louis — The market has strengthened, following recent mill purchases of No. 2 steel and cast grades at advances of 50 cents. A number of items are up 25 to 75 cents, and offerings at the higher levels are relatively light.

Toronto, Ont.—Mills are taking steady shipments against contracts, but most other users are buying less. Machinery cast is in steady demand, but stove plate is slow and turnings, borings and clippings are dull. Dealers still look for higher prices, but no action has been taken in this direction.

Steel in Europe

Foreign Steel Prices, Page 89

London—(*By Radio*)—Basic steelmaking iron output is expanding in Great Britain. Steel production continues high, supplemented by Continental and Australian imports of semifinished steel and American steel scrap. Shipbuilding activity is increasing. The largest British blast furnace, with capacity of 3500 tons weekly, has been lighted. Negotiations are under way for merger of Appleby-Frodingham Steel Co. Ltd., Scunthorpe, and Stanton Ironworks Co. Ltd., Asfordby, with Stewarts & Lloyds Ltd.

The Continent reports export trade fair, with prices less firm.

Governments of France and Belgium have announced abandonment of the import quota system on a number of industrial products as a move in lowering international trade barriers and to improve trade between the two countries.

Iron Ore

Iron Ore Prices, Page 90

Cleveland—July shipments of Lake Superior iron ore from upper lake ports were 93.1 per cent larger than a year ago, according to the Lake Superior Iron Ore association. Total movement was 6,309,938 gross tons, against 5,572,998 tons in June and 3,042,125 in July, 1938. Shipments for the season to Aug. 1 were 105.9 per cent larger than a year ago. Comparisons follow:

Port	To Aug. 1, 1939	To Aug. 1, 1938
Escanaba	878,593	341,130
Marquette	1,334,643	368,831
Ashland	1,717,171	774,288
Superior	4,726,243	2,750,662
Duluth	3,418,192	1,627,889
Two Harbors	3,466,345	1,683,975
Total	15,541,187	7,546,775

Warehouse

Warehouse Prices, Page 89

Cincinnati—Sales continue close to the June and July level, with warehouses hoping resistance to a summer lull presages an early upturn this quarter.

Chicago—August has started out well, following a strong finish in July which brought the month's business to a par with June. A steady pace is expected the next few weeks.

Cleveland—Business is well sustained, generally being equal to or ahead of the July rate. Contemplated revision in the price of hot-rolled carbon bars is expected to be deferred until the end of this quarter.

New York — While warehouse volume has declined moderately, July sales compared favorably with June and in some instances were slightly higher. Alloys and lighter steel products make relatively the best showing.

Philadelphia — Warehouses have increased the extra on cold-finished bars under 300 pounds from 50

PAGE

Hi-Tensile "G"

for welds that must stand ***heavy strain***

● Jobs like welding the circle frame of a road grader, as shown above, are "duck soup" for Page Hi-Tensile "G." For Hi-Tensile "G" produces joints that withstand shock and strain. Produces them at a profit, too.

Any welder who has run Page Hi-Tensile "G" can tell you it's a remarkably fast rod, quiet-running and with very little spatter. It produces a smooth bead and is good for production, maintenance and construction work. . . . Your local Page distributor will give you full information.

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cents to $2. The base is unchanged at 4.06c on 1000 pounds and over. Business is at the July rate but smaller than expected.

St. Louis—July business was bolstered by better demand from public utilities and railroads, and one interest reported sales of wire fencing and accessories the best for that month in four years. Building items and oil country goods are active.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound.

July	Electro, del. Conn.	Copper Lake, del. Midwest	Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
29	10.25	10.37½	9.87½	48.40	48.20	4.85	4.70	4.60	20.00	12.00	35.00
31	10.25	10.37½	9.87½	48.40	48.20	4.95	4.80	4.60	20.00	12.00	35.00
Aug.											
1	10.37½	10.37½	10.00	48.45	48.15	4.95	4.80	4.60	20.00	12.00	35.00
2	10.37½	10.37½	10.00	48.50	48.25	4.95	4.80	4.60	20.00	12.00	35.00
3	10.50	10.50	10.12½	48.60	48.40	5.05	4.90	4.60	20.00	12.00	35.00
4	10.50	10.50	10.12½	48.85	48.65	5.05	4.90	4.60	20.00	12.00	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb., except as specified. Copper brass products based on 10.50c Conn. copper

Sheets

Yellow brass (high) 16.85
Copper, hot rolled 18.62
Lead, cut to jobbers 8.30
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.60
Seamless copper 19.12

Rods

High yellow brass 12.19
Copper, hot rolled 15.12

Anodes

Copper, untrimmed 15.87

Wire

Yellow brass (high) 17.10

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.25-6.50
Cleveland 7.00-7.25
Chicago 6.50-6.75
St. Louis 6.37½-6.62½

Heavy Copper and Wire

New York, No. 1 ..... 8.25-8.37½
Cleveland, No. 1 ..... 8.00-8.25
Chicago, No. 1 ..... 8.12½-8.37½
St. Louis 7.87½-8.12½

Composition Brass Turnings

New York 5.50-5.75

Light Copper

New York 6.75-7.00
Cleveland 6.25-6.50
Chicago 6.50-6.75
St. Louis 6.37½-6.62½

Light Brass

Cleveland 4.00-4.25
Chicago 4.25-4.50
St. Louis 3.87½-4.12½

Lead

New York 4.10-4.35
Cleveland 3.75-4.00
Chicago 4.10-4.20
St. Louis 3.75-4.00

Zinc

New York 2.60-2.65
Cleveland 2.25-2.50
St. Louis 2.25-2.50

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 14.75-15.00
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 10.75
Standard No. 12 aluminum 11.75-12.00

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Nonferrous Metals

New York — Steady advance in London prices coupled with active demand have resulted in posting of higher prices for copper and lead last week. The new levels were supported further by improvement in the statistical positions of the industries and prospects of increases in actual consumption.

Copper — All sellers moved to the basis of 10.50c, Connecticut, for electrolytic and 10.12½c, f.o.b. refinery for casting copper. Allied products alvanced proportionately. The wire bar level in London was quoted at 10.71c, c.i.f. Europe at the close, which would permit a further advance here, but leading interests were concerned lest consumer demand would not support still higher levels at this time. Electrolytic sales exceeded expectations.

Lead — Prices advanced to 5.05c, New York, and 4.90c, East St. Louis, following the advance in London equivalents to around 3.30c. Demand was heavy with sellers forced to dig deeply into reserves to cover inquiry.

Zinc — Market remained very firm at 4.60c, East St. Louis, for prime western as London equivalents crossed the 3-cent level and buying held up at a satisfactory pace.

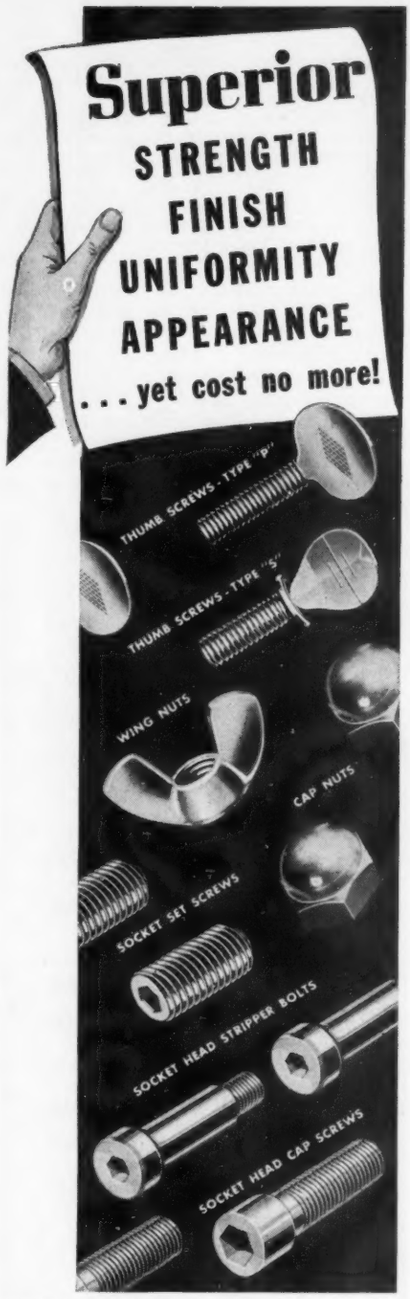
Tin — Although London spot standard remained pegged by the buffer pool executive at £229 17s 6d, Straits spot advanced to 48.85c as importers had difficulty in covering in the Eastern market.

Bethlehem Improving Sparrows Point Plant

■ Bethlehem Steel Co. has started work on a number of improvements at its Sparrows Point, Md., plant, which may run into several million dollars. They include a second unit for producing wire by the Bethanized process to increase capacity to 1000 tons. Production of cold reduced tin plate will be speeded up by adding equipment such as motors and handling tables. The company also will install equipment for producing by the continuous welding process small-diameter pipe, ranging from ⅜-inch to 3 inches.

Equipment

Chicago — Machinery buying in this district was substantially unchanged in the past few weeks. A number of sizable orders have been placed so far this month, but in general a bit of summer quiet still prevails. Equipment interests are moderately optimistic, however, and



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Cold-forged
SOCKET SCREWS
WING NUTS · CAP NUTS
THUMB SCREWS
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REPUTABLE DISTRIBUTORS

foresee possibility of improvement this month over July. More definite pickup is not expected until September, when it is hoped June levels will be approached. Little railroad business is reported.

Boston—Machine tool orders hold sufficiently well to maintain backlogs with most builders, many being well booked through the remainder of the year. Buying continues largely for replacement, diversified orders for one or two tools at a time predominating. Some business is likely to be held up until after the machinery show in October. Meanwhile government shop purchasing is expanding, a large list closing during the remainder of the month for the tooling of the torpedo shop, Alexandria, Va. Orders for machinery for navy yards continue to trickle to New England shops. Henry Prentiss & Co. is low on four turret lathes for the Boston yard shops. Bullard Co., Bridgeport, Conn., is low on a vertical boring mill, Mare Island, Calif. Crane inquiries are heavy, notably for ship yards, both government and private.

CONSTRUCTION and ENTERPRISE

Michigan

CHELSEA, MICH.—Chelsea Spring Co. has been organized to manufacture auto parts, by Desire R. Van Rove, Northville, Mich.

DEARBORN, MICH.—Ford Motor Co. will install motors and controls, switchgear, conveyors, electric hoists and other equipment in new one-story addition, 300 x 680 feet at River Rouge plant. Estimated cost $5,000,000. (Noted July 31).

DETROIT—Gelatin Products Co., 620 East Hancock, is erecting a factory on Grinnell avenue. Smith-Hinchman & Grylls Inc., 800 Marquette building, are architects.

DETROIT—J. A. Utley, 6031 Mansur street, has general contract for erection of a woodworking building, 50 x 200 feet, for Chevrolet division of General Motors Corp., Flint, Mich. Utley also has contract for alterations to three buildings in Flint for Fisher Body division of General Motors.

GRAND RAPIDS, MICH.—Grand Rapids Brass Co., 66-90 Scribner avenue, northwest, has been formed by Herman Pleasant, Grand Rapids, to engage in general manufacturing.

Connecticut

NEW LONDON, CONN.—Public works officer, submarine base, will take bids in September for two 600-kilowatt motor generator sets, with control panels.

TORRINGTON, CONN.—Torrington Co., 59 Field street, will soon let contracts for erection of one-story 70 x 300-foot factory. Cost over $40,000.

New York

BUFFALO—Chevrolet division of Gen-

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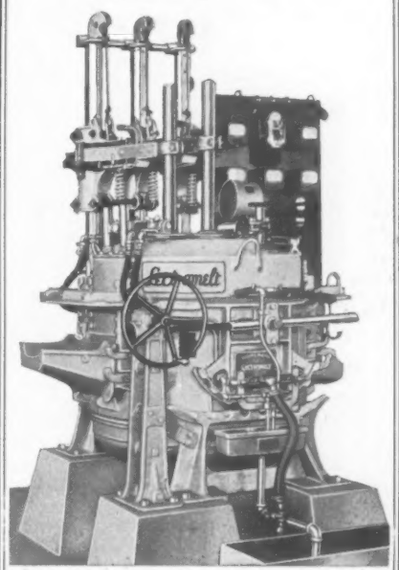

Illustration shows a 500 pound capacity 3 phase direct arc LECTROMELT furnace installed in jobbing steel foundry.

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BUILT IN STANDARD SIZES
25 LBS. TO 50 TONS CAPACITY

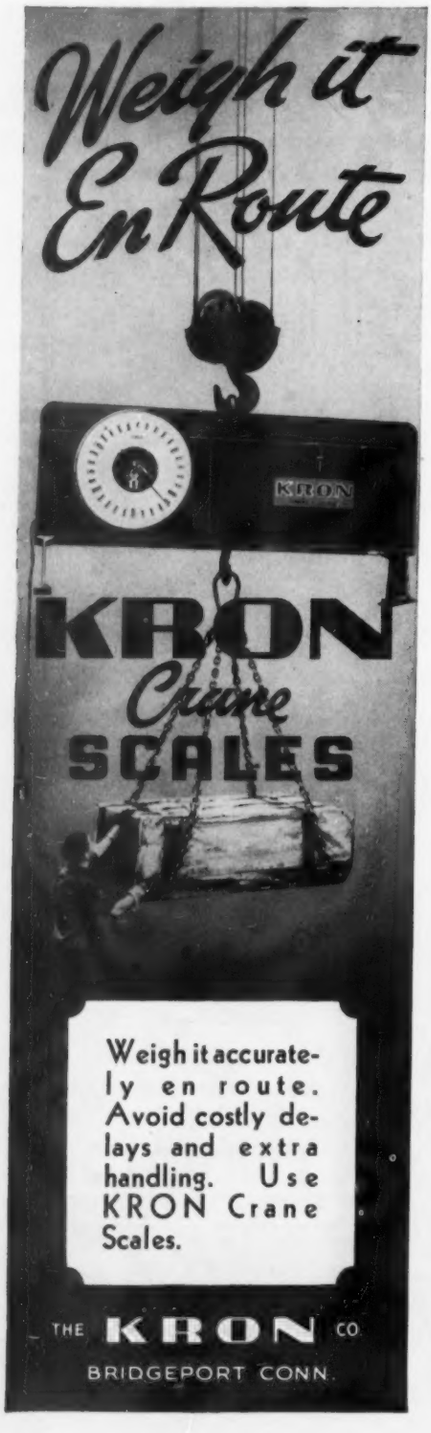
PITTSBURGH
LECTROMELT
FURNACE
CORP.
PITTSBURGH, PA.

eral Motors Corp. will spend approximately $1,250,000 for new dies and machinery at its plant in Buffalo for 1940 model work. Alfred G. Gulliver is plant manager.

New Jersey

CLIFTON, N. J.—Curtiss-Wright Corp., propeller division, 64 Lakeview avenue, Clifton, plans installation of motors and controls, conveyors, electric hoists and other equipment in two new additions to plant. Cost over $225,000.

ELIZABETH, N. J.—Jo-Carroll Electric Co-operative, M. S. Rogers, president, has $75,000 REA grant for erection of generating plant.



PERTH AMBOY, N. J.—City council has plans under way for improvements in municipal electric power station. Financing being arranged through federal aid.

PERTH AMBOY, N. J.—Barber Asphalt Corp., Insurance Co. of North America building, Philadelphia, proposes new refining plant at Barber station, Perth Amboy, and will install motors and controls, conveyors, transformer and accessories, switchgear and other equipment. Cost estimated at $1,000,000.

Pennsylvania

PHILADELPHIA—William Cramp & Sons Ship & Engine Building Co., William T. Smith, president, controlled by the American Ship & Commerce Corp., 34 Broadway, New York, plans installation of heavy duty motors and controls, switchgear, conveyors, electric hoists and other equipment in connection with modernizing and improving local shipbuilding plant which has been closed a number of years. Cost reported over $500,000.

Ohio

MARTINS FERRY, O.—Wheeling Corrugating Co., Wheeling, W. Va., is installing four galvanizing pots at its plant here to take care of expanding business. This is expected to be first part of general expansion program.

NORTH BALTIMORE, O. — Village, Fred Halboth, mayor, is contemplating municipal light and power system. Project includes erection of building, 38 x 111 feet; installation of two 450-horsepower, 300 r.p.m. diesel engines; one 375-horsepower, 3000 r.p.m. engine, to cost approximately $194,671. Maturity dependent on state supreme court's decision which convenes in September.

STRYKER, O.—Village, G. M. Vernier, clerk, is having plans prepared for power plant addition to double generating capacity. Carl J. Simon, Van Wert, O., is engineer.

Indiana

INDIANAPOLIS — Hecker Products Corp., 1437 West Morris street, will soon let contracts for three-story, 100 x 128-foot factory building, costing about $100,000. Lockwood-Green Inc., 30 Rockefeller plaza, New York, engineer.

RICHMOND, IND.—City, W. Ray Stevens, general manager, light plant, plans municipal light plant improvements, including installation of boiler and auxiliary equipment, and turbogenerator.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids Aug. 11, schedule 6821, engine lathes; schedule 6822, electric drills; schedule 6823, electric grinders; Aug. 15, schedule 6836, sheet and strip steel; schedule 6844, hydraulic pumps and motors; schedule 6881, steel plates.

Louisiana

MORGAN CITY, LA.—City voted $110,000 bonds for improvements to electric light and power plant and waterworks system. Joe Evans, city engineer. (Noted July 3).

North Carolina

GREENSBORO, N. C.—Glascock Stove & Foundry Co., West Lee street, has applied for permit for erection of addition, containing 10,000 feet of floor space.

Missouri

BUTLER, MO.—REA has allotted $109,000 to the Osage Valley Electric Co-operative, E. C. Westhoff, superintendent, to finance construction of 115 miles of rural transmission lines.

LAMAR, MO.—Barton Electric Co-operative has been allotted $133,000 by REA to build 150 miles of rural transmission lines.

MEXICO, MO.—REA has allotted $157,000 to Consolidated Electric Co-operative to finance construction of 200 miles of rural transmission lines.

MOUNT VERNON, MO.—Ozark Electric Co-operative, Arley Brown, president, will build 237 miles of rural trans-

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mission lines, for which REA has allotted $215,000.

Oklahoma

TULSA, OKLA.—City water department will spend about $600,000 in connection with waterworks extensions and improvements, including installation of heavy-duty, electric-operated pumping machinery.

Minnesota

ALBERT LEA, MINN.—REA has allotted $283,000 to the Freeborn-Mower Co-operative Light & Power association, Lewis Brown, superintendent, to finance construction of about 300 miles of rural transmission lines.

MAPLE LAKE, MINN.—REA has allotted $142,000 to the Wright-Hennepin Electric Co-operative, Edward R. Slebiska, superintendent, to finance construction of 136 miles of rural transmission lines.

MINNEAPOLIS—Chicago, Rock Island & Pacific Railroad Co., Metropolitan Life building, Minneapolis, plans installation of motors and controls, conveyors, switchgear, electric hoists, loaders and other equipment in new railroad terminal. Cost $300,000.

South Dakota

WAGNER, S. DAK.—Village, Jake Eggers, mayor, is considering construction of municipal light and power plant.

Nebraska

ANSLEY, NEBR.—City will complete plans soon and take bids on construction of wells, pump house and pipe lines and installation of pumps. E. H. Dunmire, 1802 B street, Lincoln, Nebr., consulting engineer.

COLUMBUS, NEBR.—Loup River Public Power district, C. B. Fricke, president, has approved plans for construction of power substation near Omaha, and will take bids Aug. 24. Total cost estimated at $500,000, including equipment.

Iowa

BROOKLYN, IOWA—T.I.P. Rural Electric Co-operative, Irving L. Nervig, superintendent, has been allotted $243,000 by REA to finance construction of 287 miles of rural transmission lines. K. R. Brown, Valley Bank building, Des Moines, Iowa, consulting engineer.

GREENFIELD, IOWA—REA has allotted $197,000 to the Farmers Electric Co-operative, Albert Ray, president, to finance construction of about 195 miles of rural transmission lines.

MAQUOKETA, IOWA — Iowa Electric Co., Cedar Rapids, Iowa, has approved plans for modernization and improvements in hydroelectric power plant on Maquoketa river, Maquoketa, including installation of equipment. Estimated cost $100,000. Harza Engineering Co., 205 West Wacker drive, Chicago, consulting engineer.

MARION, IOWA—Linn County Rural Electric Co-operative, Glenn Stoner, president, has been allotted $224,000 by REA to finance construction of 236 miles of rural transmission lines.

MOVILLE, IOWA—REA has allotted $100,000 to the Woodbury County Rural Electric Co-operative, Dale Shriener, superintendent, to finance construction of about 100 miles of rural transmission lines.

SUMNER, IOWA—City, H. W. Bathke, city clerk, is preparing plans for additional filter bed and new electric lifts to replace old air pumps at municipal sewage plant. E. E. Schenk, 214 Waterloo building, Waterloo, Iowa, consulting engineer.

Colorado

BRIGHTON, COLO.—Union Rural Electric Corp. has completed plans and will take bids soon for construction of complete rural electric distribution system to cost about $320,000. (Noted May 29).

RYE, COLO.—REA has approved project of San Isabel Electric association, Paul Ray, vice president, consisting of construction of 80 miles of rural transmission lines costing about $125,000.

Nevada

BOULDER CITY, NEV.—Department of water and power, 207 South Broadway, Los Angeles, has plans under way for shops and operating buildings at Boulder City, to be used in connection with power supply from federal hydroelectric power development at Boulder dam. Project includes several structures for electrical and mechanical service, electric-operated pumping station and other units. Bids will be asked soon.

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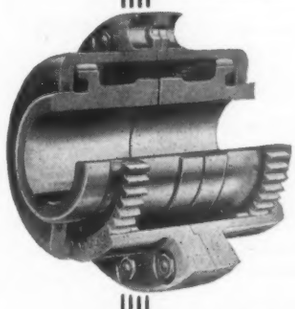

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Wood, R. D., Co., 400 Chestnut St., Philadelphia, Pa.

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Air Reduction Sales Co., 60 E. 42nd St., New York City.
Linde Air Products Co., The, 30 E. 42nd St., New York City.
National Cylinder Gas Co., 205 W. Wacker Dr., Chicago, Ill.

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Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

ACIDS (Pickling)
American Chemical Paint Co., Ambler, Pa.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

AIR COMPRESSORS—See COMPRESSORS (Air)

AIR CONDITIONING EQUIPMENT
Peabody Engineering Corp., 580 Fifth Ave., New York City.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Worthington Pump & Machinery Corp., Harrison, N. J.

ALKALI CLEANING COMPOUNDS
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia, Pa.

ALLOYS—See FERROALLOYS

ANGLE IRON BENDERS
Excelsior Tool & Machine Co., Ridge and Jefferson Aves., East St. Louis, Ill.

ANGLES, CHANNELS—See BEAMS, CHANNELS, ANGLES

ANNEALING BOXES—See BOXES (Annealing)

AXLES
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Republic Steel Corp., Dept. ST, Cleveland, O.
Standard Steel Works Co., Paschall P. O., Philadelphia, Pa.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.

BABBITT METAL
Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.

BALING PRESSES
Logeman Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

BALL TRANSFERS
Mathews Conveyer Co., 142 Tenth St., Ellwood City, Pa.

BALLS (Brass or Bronze)
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Strom Steel Ball Co., 1842 So. 54th Ave., Cicero, Ill.

BALLS (Special Alloy Metals)
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.

BALLS (Steel)
(*Also Stainless)
*Strom Steel Ball Co., 1842 So. 54th Ave., Cicero, Ill.

BAND SAWS (Metal Cutting)
Simonds Saw & Steel Co., Fitchburg, Mass.

BANDS—See HOOPS AND BANDS

BANDS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

BAR BENDERS
Kardong Bros. Inc., 346 Buchanan St., Minneapolis, Minn.

BARGES (Steel)
American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Dravo Corp. (Engin'r'g Works Div.), Neville Island, Pittsburgh, Pa.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Maryland Dry Dock Co., Baltimore, Md.

BARRELS (Steel)
Pressed Steel Tank Co., Milwaukee, Wis.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago
Columbia Steel Co., San Francisco, Calif.
Firth-Sterling Steel Co., McKeesport, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
LaSalle Steel Co., P. O. Box 6800-A, Chicago, Ill.
Midvale Co., The Nicetown, Philadelphia, Pa
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Steel & Tube Co., Canton, O.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.

BARS (Brass, Bronze or Copper)
Johnson Bronze Co., 550 So. Mill St., New Castle, Pa.

BARS (Concrete Reinforcing)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Dept. ST, Cleveland, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Reinforcing)
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.

BARS (Steel)
(*Also Stainless)
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
*Midvale Co., The, Nicetown, Philadelphia, Pa.
*Republic Steel Corp., Dept. ST, Cleveland, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Stanley Works, The, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

BASKETS (Dipping—Hard Rubber)
American Hard Rubber Co., 11 Mercer St., New York City.

BATTERIES (Storage)
Electric Storage Battery Co., The, 19th St. and Allegheny Ave., Philadelphia, Pa.

BEAMS, CHANNELS, ANGLES, ETC.
(*Also Stainless)
*Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco, Calif.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 No. Michigan Ave., Chicago, Ill.
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Torrington Co., The, Torrington, Conn.

BEARINGS (Babbitt)
Johnson Bronze Co., 550 So. Mill St., New Castle, Pa.

BEARINGS (Brass, Bronze)
Cadman, A. W., Mfg. Co., 28th and Smallman Sts., Pittsburgh, Pa.
Johnson Bronze Co., 550 So. Mill St., New Castle, Pa.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shenango-Penn Mold Co., Dover, O

BEARINGS (Journal)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Needle)
Torrington Co., The, Torrington, Conn.

BEARINGS (Oilless)
Rhoades, R. W., Metaline Co., 50 3rd St., Long Island City, N. Y.

BEARINGS (Quill)
Bantam Bearings Corp., South Bend, Ind.,

BEARINGS (Radial)
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
American Roller Bearing Co., 416 Melwood St., Pittsburgh, Pa.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Shafer Bearing Corp., 35 E. Wacker Drive, Chicago, Ill.
SKF Industries, Inc., Front St., and Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roll Neck)
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Morgan Construction Co., Worcester, Mass.
National Bearing Metals Corp., 928 Shore Ave., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Co-operation Is Key

To the Editor:

I was very much interested in reading Mr. R. L. Hartford's article on present-day trends in the steel business. (STEEL, June 12, p. 23) Based on my own observations in the steel industry, I can agree with most of the statements he has made.

Personally, I cannot get much excited over the come-back of the bessemer process. Undoubtedly, under certain ideal circumstances, it will be used to a greater extent than in the past decade. The question of control, particularly for specialty grades, (and how many steels have not specialty requirements,) is still the big factor. Recent changes in open-hearth design, insulation, better knowledge of heat transfer and improved refractories have brought the fuel figure down to 4,000,000 or less B.T.U. per ton. Control of charge, metallurgically balanced slags, better knowledge of deoxidation practices, and better trained personnel have made the open-hearth process more flexible and more valuable than ever before.

In the heating of ingots, slabs and bars, stress is being placed on uniformity of practice, proper soaking of metal under definite gaseous atmospheres and standardization of rolling practices, as far as roll contours, percentage of reduction, speed of mills and temperature of metal are concerned.

In the flat-rolled industry more stress is being placed on accuracy of gage, proper shape of strip and good surface than on tons per hour because it is very costly to turn out a large tonnage of cold-reduced sheets or coils and then have the inspector throw the product into the reject or scrap pile. This same zeal to control carefully every operation can be seen all along the line in the processing of cold-reduced coils.

In modern, efficient steel plant practice, stress is now being placed on research to determine best practices to follow and ultimate standardization of all practices from the blast furnace to the shipper, as determined by the operating, metallurgical and combustion engineers

This plan relieves the manager, superintendent and foreman of petty details and allows them to concentrate on the problems of improved quality, service to customers and cost of reduction. Standardization is possible only where loyal, enthusiastic, intelligent workmen do their part. Such co-operation can exist only where the workmen are given facts about the needs of the business and are asked for help and advice. It is our belief, based on more than a third of a century of contact with workmen, that American workmen are essentially fair. They will co-operate if they are treated fairly and given an opportunity to understand what the problems of industry are. First a presentation of facts, then understanding, and then finally comes co-operation.

"Charm School" Does Wonders

We believe that a plant with mediocre equipment, manned by workmen, who are imbued with the right team spirit and a desire to turn out quality products, will excel the record of an ultra-modern plant having an organization where strife and discord are the rule. This co-operation does not come overnight. The employment policy of the management must be sound. Over a long period of time the management, by many small but important decisions and practices, must train its men in co-operative effort and sell them on the belief that it is trying to be fair.

In our plant we have made use of a comprehensive training program. During the years 1938 and 1939 over 20 per cent of our plant personnel has taken part in this program, which includes courses in practical business psychology for foremen and superintendents. Our men call it "Charm School" and such it is. "Learning to give instructions in an understanding manner with a smile."

Under superintendents and staff experts, men from all ranks study our processes from an operating and technical standpoint. Apprentices are trained not only to be good mechanics but to learn how to manage men and carry out company policies. There is close harmony between supervisors and employe representatives.

The manager writes a weekly letter to every employe, telling them of business conditions, in general, and schedules for the week. Items of interest, such as production, quality or safety records, construction progress, anniversaries of veterans in the mill, suggestions of how workmen can help improve quality or lower costs are given a prominent place. These letters are given workmen at the pay station

The proof that men take them home to read to their families is the fact that none are ever found along the road to the mill on the next day. It pays to tell your men what your problems are.

Keen competition will force improvements in practices, which will result in lower costs and thus a wider distribution of the products of steel will be attained.

L. F. REINARTZ

American Rolling Mill Co., Middletown, O.

PAINTGRIP
saved this shop 45%
ON "MAKE-READY" COSTS

• A manufacturer of baked enameled shower cabinets saw an opportunity to cut shop costs by using ARMCO PAINTGRIP* galvanized sheets — and he made the most of it!

Formerly, regular galvanized sheets were used. This meant costly etching operations before finishing and at least a slight loss of the protective zinc coating. Now, with ARMCO PAINTGRIP Sheets, cabinets are finished immediately. Result: *A "make-ready" saving of 45%.* (Difference between the manufacturer's etching costs and the small extra cost of PAINTGRIP compared with plain galvanized.)

Real shop savings there! But that isn't the only benefit. PAINTGRIP assures a smoother, longer-lasting paint finish. Time is saved; orders for cabinets are filled on schedule even under peak demand. Shop men are happier. They like to work with PAINTGRIP because there is no acid etching to do.

Why not try ARMCO PAINTGRIP for *your* painted products? There's a good chance that it can help you cut shop costs, add beauty and longer life to your products. Let us send you a working sample of PAINTGRIP. Then you can get a good idea of the savings that are possible in your own shop. Write The American Rolling Mill Company, 1590 Curtis St., Middletown, O.

**A special bonderized finish.*

ARMCO PAINTGRIP SHEETS